SONY

3-798-741-**21** (1)

Video Camera Recorder Hi8

Operation Manual

Before operating the unit, please read this manual thoroughly, and retain it for future reference.

Owner's Record

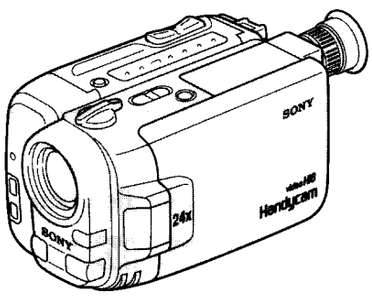
The model and serial numbers are located on the bottom. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. **CCD-TRV70**

Serial No. _____

Model No. **AC-V26**

Serial No. _____



video Hi8 Handycam

CCD-TRV70

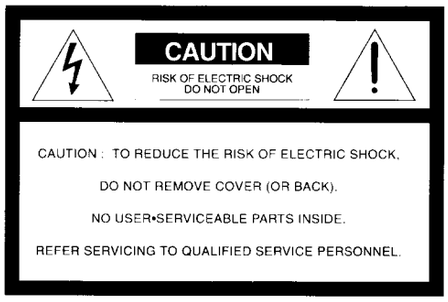
© 1995 by Sony Corporation

Welcome to video Hi8

Congratulations on your purchase of this Sony Handycam® camcorder. With your Handycam, you can capture life's precious moments with superior picture and sound quality. Your Handycam is loaded with advanced features, but at the same time it is very easy to use. You will soon be producing home video that you can enjoy for years to come.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION : TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER•SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

RECYCLING NICKEL-CADMIUM BATTERIES

Ni-Cd

NICKEL-CADMIUM BATTERY. MUST BE DISPOSED OF PROPERLY.

Nickel-Cadmium batteries are recyclable. You can help preserve our environment by returning your unwanted batteries to your nearest Sony Service Center or Factory Service Center for collection, recycling or proper disposal.

Note: In some areas the disposal of nickel-cadmium batteries in household or business trash may be prohibited.

For the Sony Service Center nearest you call 1-800-222-SONY (United States only).
For the Factory Service Center nearest you call 416-499-SONY (Canada only).

Caution: Do not handle damaged or leaking nickel-cadmium batteries.

For the Customers in the U.S.A.

WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

— Reorient or relocate the receiving antenna.
— Increase the separation between the equipment and receiver.
— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

For the Customers in CANADA

CAUTION

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED AC PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

Table of Contents

Before You Begin
Notes and Precautions 4
Checking Supplied Accessories 5

Getting Started
Charging and Installing the Battery Pack 6
Inserting a Cassette 9

Basic Operations
Camera Recording 10
  Using the Zoom Feature 12
  Shooting with the LCD Screen 13
Hints for Better Shooting 15
Checking the Recorded Picture 17
Playing Back a Tape 18
Searching for the End of the Picture 21

Advanced Operations
Using Alternate Power Sources 22
  Using House Current 22
Recording with the Date or Time 24
Fade-in and Fade-out 25
Using the PROGRAM AE Function 26
Enjoying Picture Effect 28
Focusing Manually 30
Shooting with Backlighting 32
Releasing the STEADY SHOT Function 33
Changing the Mode Settings 34
Watching on a TV Screen 36
Editing onto Another Tape 37
Recording from a VCR or TV 38

Additional Information
Changing the Lithium Battery in the Camcorder 39
Resetting the Date and Time 40
Playback Modes 41
Tips for Using the Battery Pack 42
Maintenance Information and Precautions 45
Using Your Camcorder Abroad 49
Trouble Check 50
Specifications 53
Identifying the Parts 54
Warning Indicators 62
Index 63

Notes and Precautions

Note on TV Color Systems

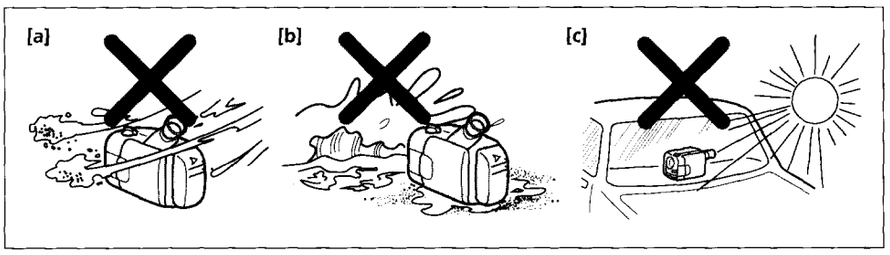
TV color systems differ from country to country.
To view your recordings on a TV, you need an NTSC system based TV. When you want to use a PAL-M system based TV, you will need a NTSC/PAL-M transcoder (as this is an NTSC system based camcorder). Please check the list on page 49 to see the TV color system of your country.

Note on Copyright

Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

Precautions on Camcorder Care

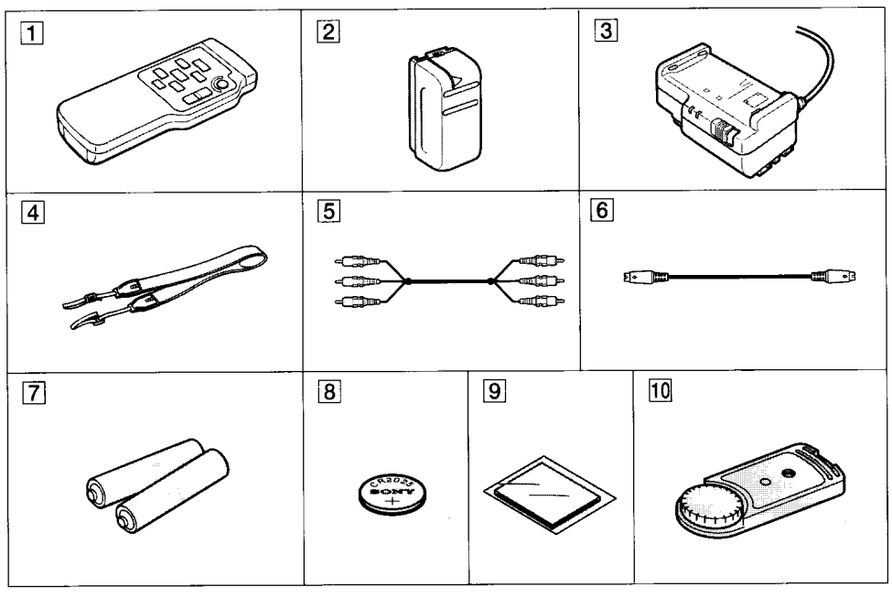
- **Do not let sand get into the camcorder. When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction and sometimes the malfunction cannot be repaired. [a]**
- **Do not let the camcorder get wet. Keep the camcorder from rain or sea water. It may cause a malfunction and sometimes the malfunction cannot be repaired. [b]**
- Never leave the camcorder under temperatures above 140 °F (60 °C), such as in a car parked in the sun or under direct sunlight. **[c]**



Please also refer to the precautions starting on page 45 in addition to the above precautions.

Checking Supplied Accessories

Check that the following accessories are supplied with your camcorder.



1 **Wireless Remote Commander (1) (p. 58)**

2 **NP-66 Battery pack (1) (p. 6)**

3 **AC-V26 AC power adaptor (1) (p. 6, 22)**

4 **Shoulder strap (1) (p. 58)**

5 **A/V connecting cable (1) (p. 36)**

6 **S video connecting cable (1) (p. 36)**

7 **Size AA (R6) Battery for Remote Commander (2) (p. 59)**

8 **CR2025 Lithium battery (1) (p. 39)**
Already installed in the camcorder.

9 **LCD screen cleaner cloth (1) (p. 47)**

10 **Tripod adaptor (1) (p. 16)**

Charging and Installing the Battery Pack

Before using your camcorder, you first need to charge and install the battery pack. To charge the battery pack, use the supplied AC power adaptor.

Charging the Battery Pack

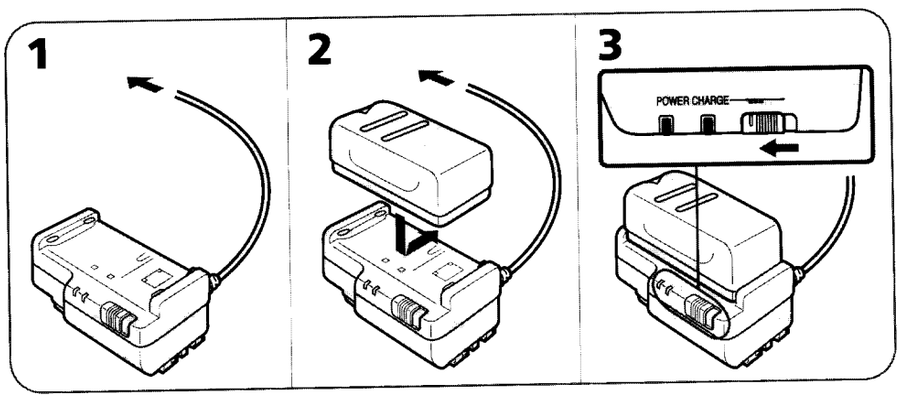
Charge the battery pack on a flat place without vibration.

(1) Connect the AC power adaptor to the wall outlet.

(2) Align the right side of the battery pack with the line on the AC power adaptor, then slide the battery pack in the direction of the arrow.

(3) Set the selector to CHARGE. The CHARGE lamp (orange) lights up. Charging begins.

When charging is completed, the CHARGE lamp goes out. Set the selector to the centre position and unplug the unit from the mains. Then remove the battery pack and install it on the camcorder. To stop charging, set the selector to the center position.



Charging Time

Battery pack	NP-66 (supplied)	NP-98/98D	NP-80/80D	NP-66H/68	NP-C65	NP-60D
Charging time*	95	215	190	125	105	90

* Approximate minutes to charge an empty battery pack using the supplied AC power adaptor (Lower temperatures require a longer charging time.)

Battery Life

Battery pack		NP-66 (supplied)	NP-98/98D	NP-80/80D	NP-66H/68	NP-C65	NP-60D
While recording[1]	LCD open[2]	30 (60)	60 (115)	50 (100)	35 (70)	30 (55)	25 (45)
	LCD close	40 (80)	85 (165)	80 (150)	55 (105)	40 (80)	35 (70)
While playing back on LCD[3]		60	120	110	75	60	50

1) Approximate minutes when recording while you repeat recording start/stop, zooming and turning the power on/off. The actual battery life may be shorter.
Approximate continuous recording time indoors is indicated in parentheses.
2) Approximate minutes when using both the viewfinder and the LCD screen. When using the LCD screen only, the battery life is longer.
3) Approximate continuous playback time indoors.

Important!

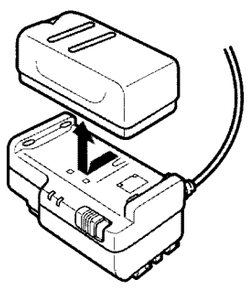
Use the battery completely before recharging!

Before you recharge the battery, make sure the battery has been used up (discharged) completely. Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.

To use up the battery, remove the cassette and turn the POWER switch to CAMERA with the battery attached, and leave the camcorder until the ⌧ indicator and the red lamp flash rapidly in the viewfinder.

Removing the Battery Pack

Slide the battery pack in the direction of the arrow.



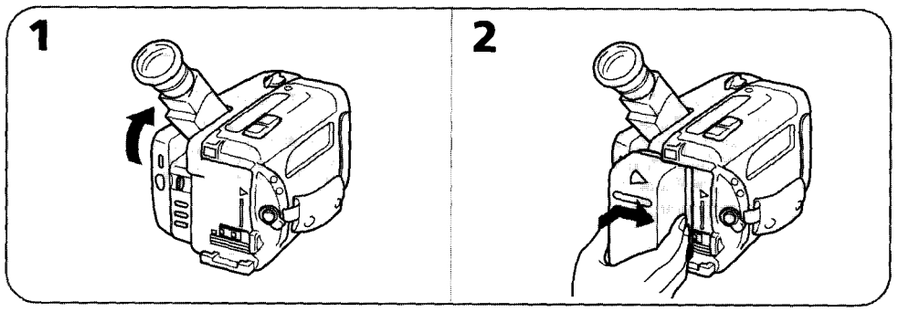
Notes on charging the battery pack

- The POWER lamp will remain lit for a while even if the battery pack is removed and the AC power cord is unplugged after charging the battery pack. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the AC power cord. After about one minute, reconnect the AC power cord and set the selector to CHARGE again.
- You cannot operate the camcorder using the AC power adaptor while charging the battery pack.

Charging and Installing the Battery Pack

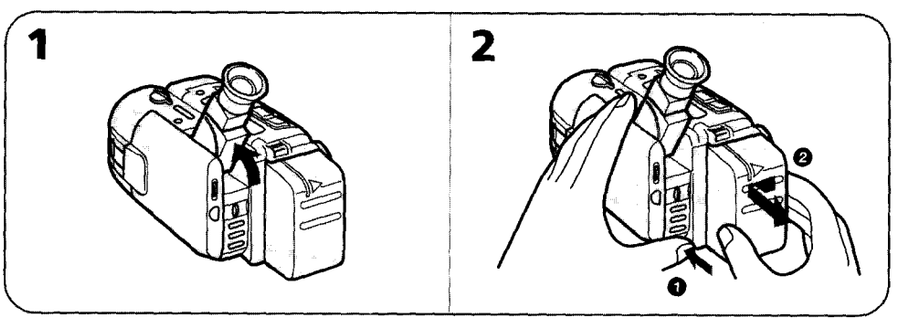
Installing the Battery Pack

(1) Lift up the viewfinder.
(2) Align the right side of the battery pack with white line on the camcorder, and slide the battery pack to the right.



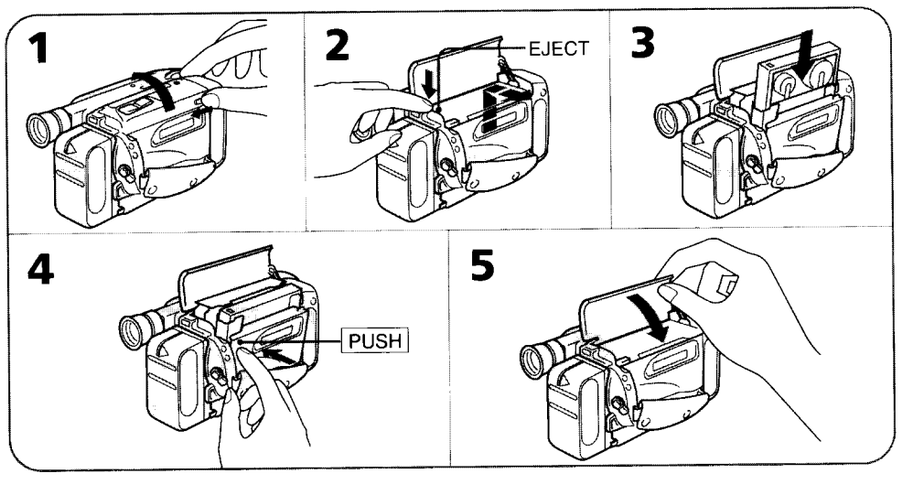
Removing the Battery Pack

(1) Lift up the viewfinder.
(2) While pressing BATT, slide the battery pack to the left.



Inserting a Cassette

Make sure that a power source is installed.
(1) While sliding the lid release knob, lift up the lid. Then open it.
(2) Press EJECT. The cassette compartment automatically lifts up and opens.
(3) Insert a cassette (not supplied) with the window facing out.
(4) Press the PUSH mark on the cassette compartment to close it. The cassette compartment automatically goes down.
(5) Close the lid until it locks.

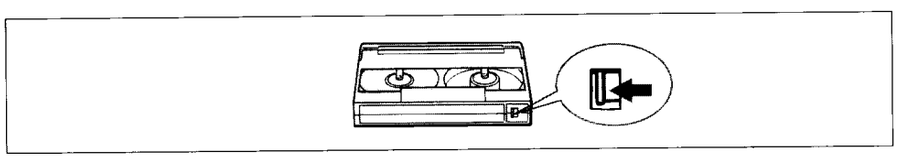


To Eject the Cassette

While sliding the lid release knob in the direction of the arrow, lift up the lid of the cassette holder and press EJECT.

To Prevent Accidental Erasure

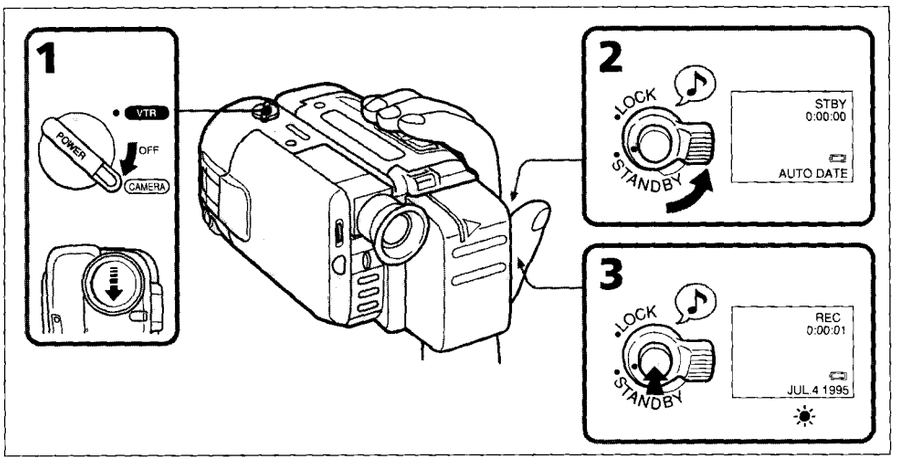
To prevent accidental erasure, slide the tab on the cassette to expose the red mark. If you try to record with the red mark exposed, the and ⏏ indicators flash in the viewfinder, and you cannot record. To re-record on this tape, slide the tab back out covering the red mark.



Camera Recording

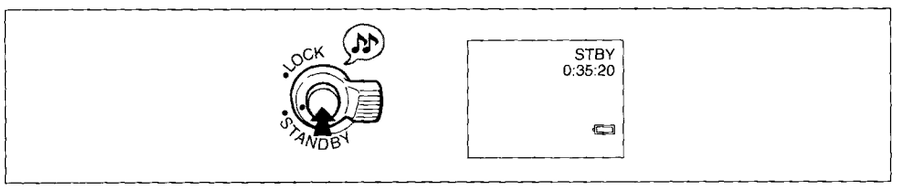
Make sure that the power source is installed and a cassette is inserted. The date is automatically recorded for 10 seconds after you start recording (AUTO DATE feature). This feature works only once a day. You can hear the beep sound to confirm your operation.
Before you record one-time events, you may want to make a trial recording to make sure that the camcorder is working correctly.

(1) While pressing the small green button on the POWER switch, turn it to CAMERA.
(2) Turn STANDBY up.
(3) Press START/STOP. The camcorder starts recording and the "REC" indicator appears and the red lamp lights up in the viewfinder.
The red lamp on the front also lights up.



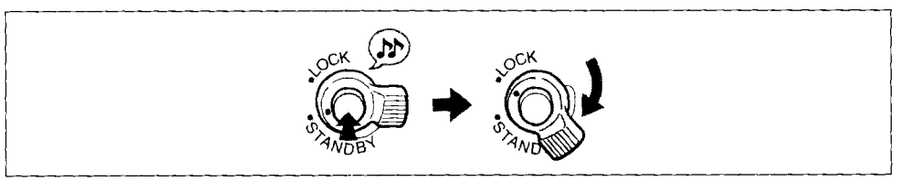
To Stop Recording Momentarily

Press START/STOP again. The "STBY" indicator appears in the viewfinder **(Standby mode)**.



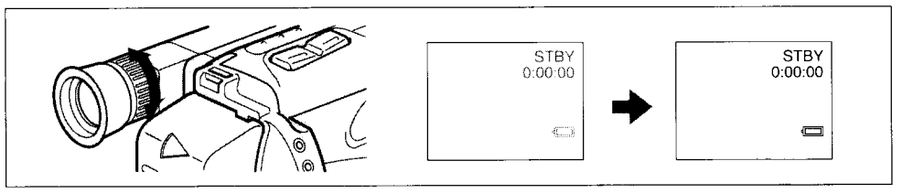
To Finish Recording

Press START/STOP to stop. Turn STANDBY down, and set the POWER switch to OFF. The lens cover closes. Then, eject the cassette (p. 9) and remove the battery pack (p. 8).



To Focus the Viewfinder Lens

If the viewfinder is not in focus at all or when you use the camcorder after someone else has used it, focus the viewfinder lens. Turn the viewfinder lens adjustment ring so that the indicators in the viewfinder come into sharp focus.



Note on Standby mode

If you leave the camcorder for 5 minutes or more with a cassette inserted in Standby mode, the camcorder goes off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, turn STANDBY down once and turn it up again. To start recording, press START/STOP.

Note on recording

When you record from the beginning of the tape, run the tape for about 15 seconds before starting the actual recording. This will ensure that you won't miss any start-up scenes when you play back the tape. You can record tapes in SP (standard play) mode only.

Note on the tape counter

The tape counter indicates the recording or playback time. Use it as a guide. There will be a time lag of several seconds from the actual time. To set the counter to zero, press COUNTER RESET located behind the LCD panel. You can know the approximate remaining tape by the remaining tape indicator (p. 61).

Note on beep sound

As indicated by the ♪ mark in the illustrations, a beep sounds when you turn the power on or when you start recording and two beeps sound when you stop recording, confirming the operation. Several beeps also sound as a warning of any unusual condition of the camcorder (p. 62). Note that the beep sound is not recorded on the tape. If you do not want to hear the beep sound, select "OFF" in the menu system (p.35).

Note on the AUTO DATE feature

The clock is set to the East Coast Standard Time at the factory. You can reset the clock (p. 40).
You can change the AUTO DATE setting by selecting ON or OFF in the menu system (p. 35).
The AUTO DATE feature works once a day. However, the date may automatically appear more than once a day when:

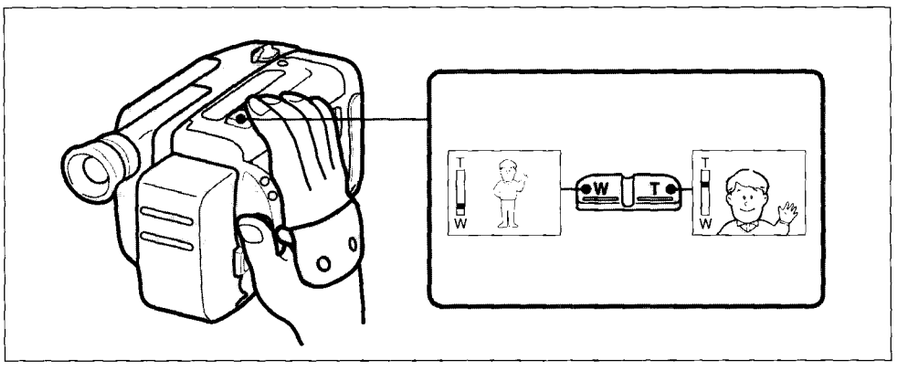
- you reset the date and time.
- you eject and insert the cassette again.
- you stop recording within 10 seconds.
- you set AUTO DATE to OFF once and set to ON in the menu system.

When moving from indoors to outdoors (or vice versa)

Turn STANDBY up and point the camcorder at a white paper for about 15 seconds so that the white balance is properly adjusted.

Using the Zoom Feature

Zooming is a recording technique that lets you change the size of the subject in the scene.
For more professional-looking recordings, use the zoom sparingly.
"T" side: for telephoto (subject appears closer)
"W" side: for wide-angle (subject appears farther away)

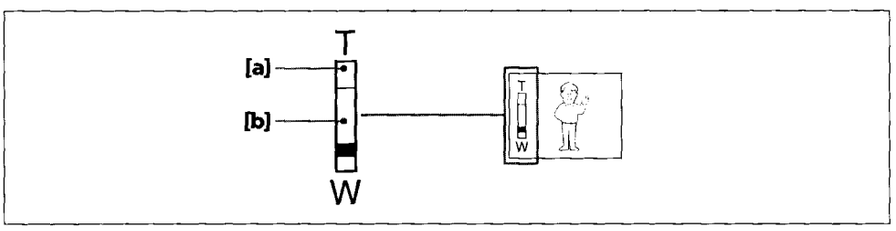


Zooming Speed (Dual speed zooming)

Press the power zoom button firmly for a high-speed zoom; press it softly for a relatively slow zoom.

Notes on Digital Zoom

- More than 12 x zoom is performed digitally, and the picture quality deteriorates as you go toward the T side. If you do not want to use the digital zoom, set the D ZOOM function to OFF in the menu system (p. 35).
- The horizontal bar in the power zoom indicator separates the digital zooming zone (above the bar **[a]**) and the optical zooming zone (under the bar **[b]**). If you set the D ZOOM function to OFF, the part above the bar disappears.

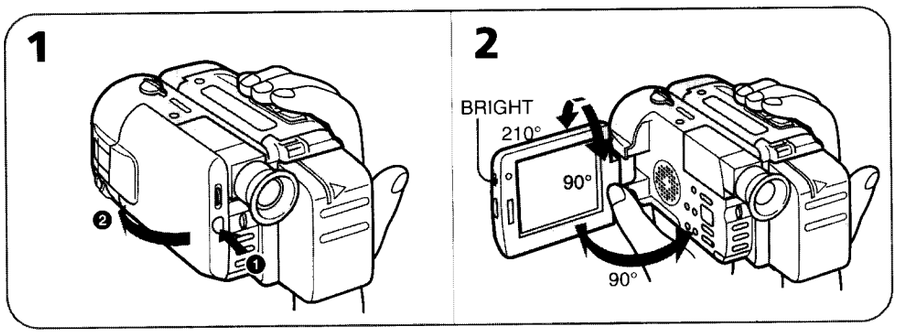


When you shoot a subject using a telephoto zoom

If you cannot get a sharp focus while in extreme telephoto zoom, press the "W" side of the power zoom button until the focus is sharp. You can shoot a subject that is at least 3.3 feet (about 1 m) away from the lens surface in the telephoto position, or about 1/2 inches (about 1 cm) in the wide-angle position.

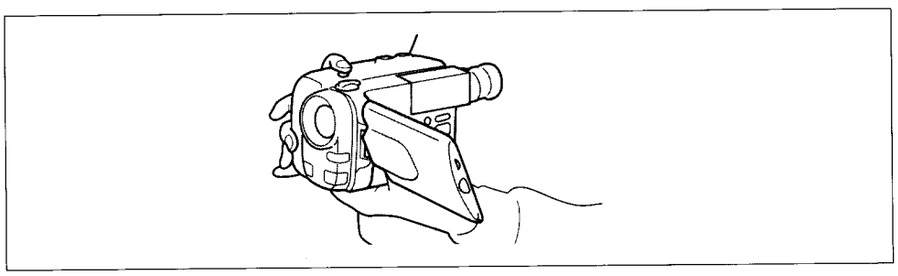
Shooting with the LCD Screen

You can also record the picture while looking at the LCD screen.
You cannot monitor the sound from the speaker during recording.
(1) While pressing PUSH OPEN, open the LCD panel.
(2) Adjust the angle of the LCD panel.
The LCD panel moves about 90 degrees to this side and about 210 degrees to the other side.
To adjust the brightness of the LCD screen, turn the BRIGHT dial.
There is the recording lamp on the left of the LCD panel.



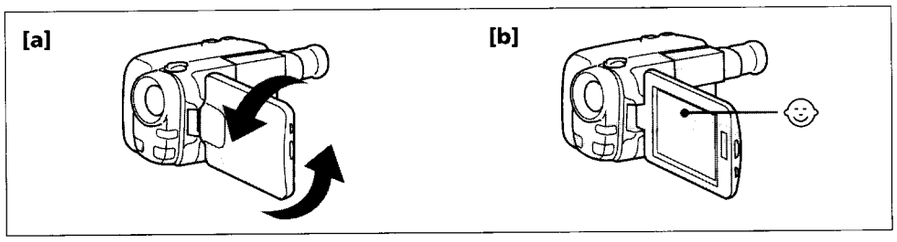
The battery life is longer when the LCD panel is closed. Use the viewfinder instead of the LCD screen to save the battery power.

While recording in a low position using the LCD panel, it is convenient to use the power zoom button located on the front panel (only for slow zoom) and the START/STOP button located on the right top.

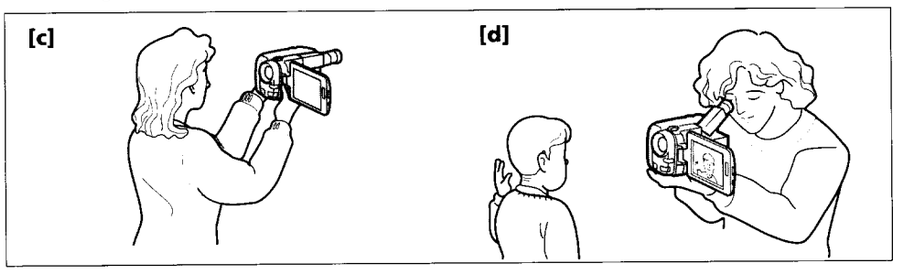


Letting the Subject Monitor the Shot

You can turn the LCD panel over so that it faces the other way.
When the LCD is turned over in CAMERA mode, you can see yourself just as you see yourself in the mirror **(mirror mode)**.
Turn the LCD panel vertically until it clicks first, then turn it over. **[a]**
The ☺ indicator appears on the LCD screen and the date, remaining battery and remaining tape indicator disappear. **[b]**

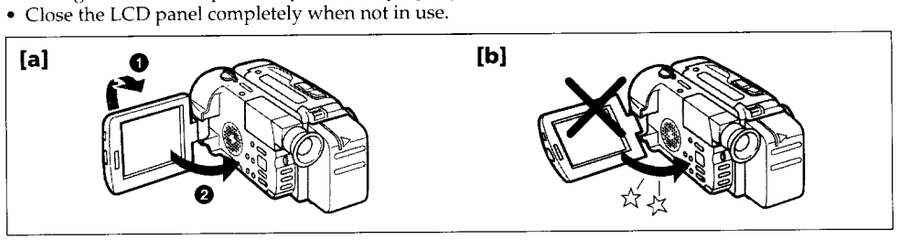


Using the mirror mode, you can record yourself while watching yourself on the LCD. **[c]**
While recording in the mirror mode, you can also use the viewfinder so that you can record a person while letting him/her monitor the shot. **[d]**



Notes on the LCD panel

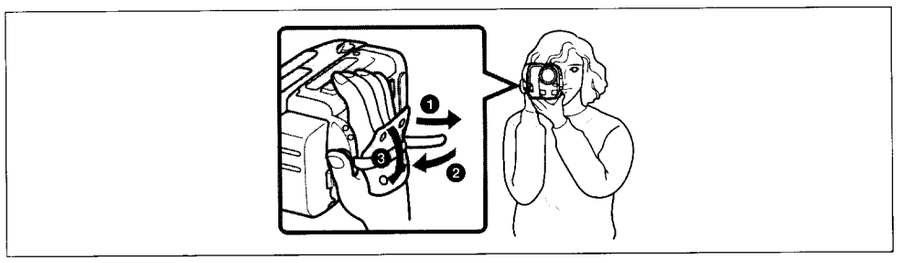
- When the LCD panel is turned over,
  - only the POWER switch, the START/STOP button, the power zoom button, the STANDBY switch, the EDITSEARCH button and the EJECT button work.
  - the date appears reversely when the AUTO DATE feature is turned on. When recorded it will be normal.
  - the STBY indicator appears as ●II and REC as ●.
  - the Steady Shot and manual focus operate even though the and indicators do not appear.
- When closing the LCD panel, turn it vertically until it clicks. **[a]**
- When turning the LCD panel, turn it always vertically; otherwise, the camcorder body may be damaged or the LCD panel may not close properly. **[b]**
- Close the LCD panel completely when not in use.



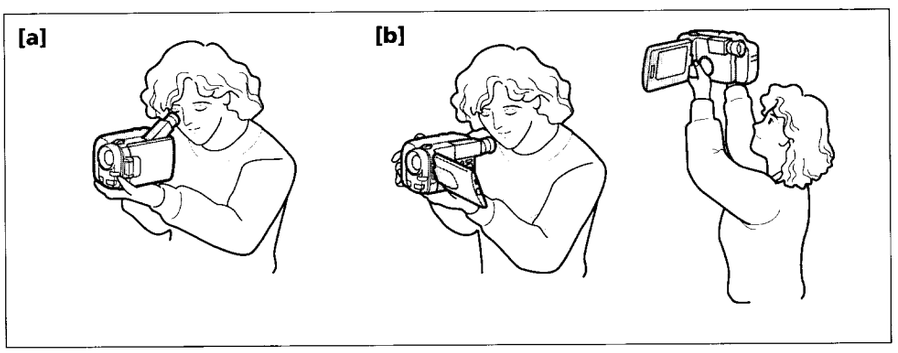
Hints for Better Shooting

For hand-held shots, you'll get better results by holding the camcorder according to the following suggestions.

- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb.



- Place your right elbow against your side.
- Place your left hand under the camcorder to support it.
- Place your eye firmly against the viewfinder eyecup.
- Use the viewfinder frame as a guide to determine the horizontal plane.
- You can record in a low position to get an interesting recording angle. Lift the viewfinder up for recording from a low position. (You can turn it up to about 80 degrees.) **[a]**
- You can also record in a low position or even in a high position using the LCD panel. **[b]**



Place the camcorder on a flat surface or use a tripod

Try placing the camcorder on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder.

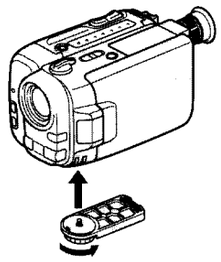
If the camcorder is difficult to balance on a tripod, use the supplied adaptor. You can attach a tripod to the adaptor. **[c]**

Do not leave the tripod adaptor on the camcorder if the camcorder is not mounted on a tripod.

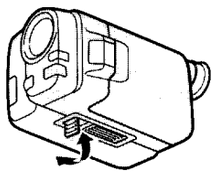
When attaching a non-Sony tripod, make sure that the length of the tripod screw is less than 9/32 inches (6.5 mm). Otherwise, the screw may damage the inner parts of the camcorder.

You can use the stand on the bottom to place the camcorder on a table when recording in a low position. **[d]**

[c]



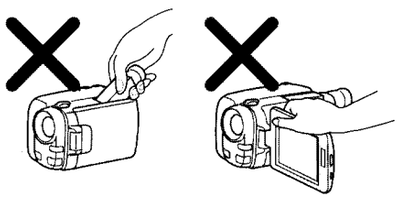
[d]



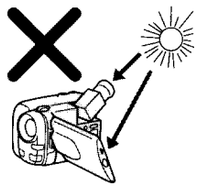
Cautions on the viewfinder and the LCD

- Do not pick up the camcorder by the viewfinder or by the LCD panel. **[e]**
- Do not place the camcorder so as to point the viewfinder or the LCD screen toward the sun. The inside of the viewfinder or the LCD panel may be deformed. Be careful when placing the camcorder under sunlight or by the window. **[f]**

[e]



[f]



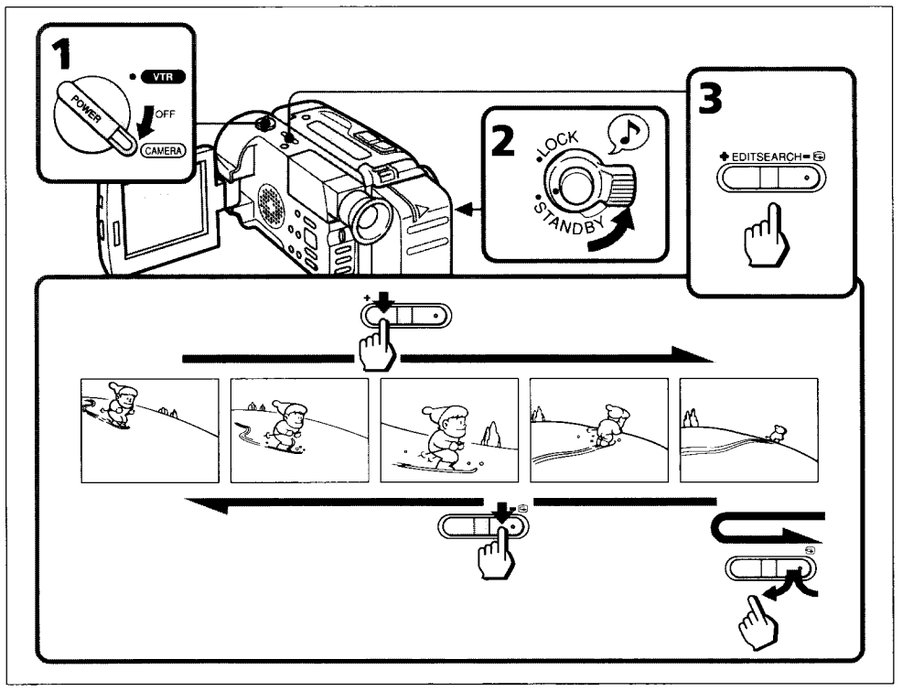
Checking the Recorded Picture

The EDITSEARCH function is used to view the recorded picture for a moment during recording. Using EDITSEARCH, you can review the last recorded scene or check the recorded picture on the LCD screen. You can also review the picture in the viewfinder.

(1) While pressing the small green button on the POWER switch, turn it to CAMERA.

(2) Turn STANDBY up.

(3) Press the – (⏪) side of EDITSEARCH momentarily; the last few seconds of the recorded portion plays back. You can also monitor the sound. **(Rec Review)**
Hold down the – side of EDITSEARCH until the camcorder goes back to the scene you want. The last recorded portion is played back. To go forward, hold down the + side. **(Editsearch)**



To Stop Playback

Release EDITSEARCH.

To Begin Re-recording

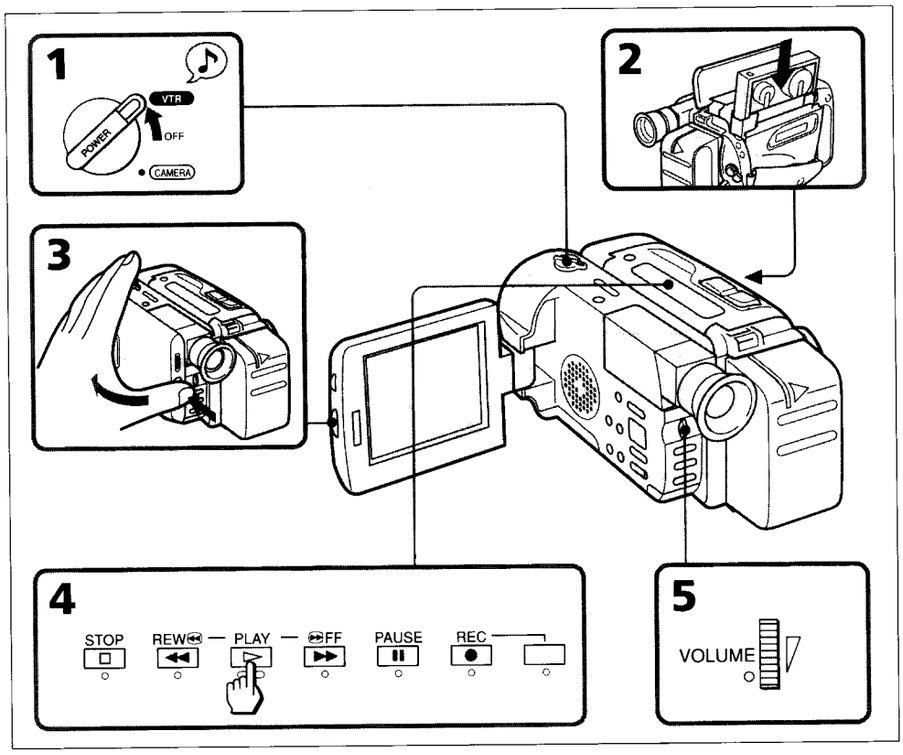
Press START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do not eject the cassette, the transition between the last scene you recorded and the next scene you record will be smooth.

Playing Back a Tape

You can monitor the playback picture on the LCD screen.

(1) While pressing the small green button on the POWER switch, turn it to VTR.
The operation keys light on.
(2) Insert the recorded tape with the window facing out.
(3) While pressing PUSH OPEN, open the LCD panel. Adjust the angle of the LCD panel or the brightness of the LCD screen if necessary (p. 13).
(4) Press ▷ to start playback.
(5) Adjust the volume using VOLUME.

You can also monitor the picture on a TV screen, after connecting the camcorder to a TV or VCR (p. 36).



To Stop Playback

Press □ during playback.

To Rewind the Tape

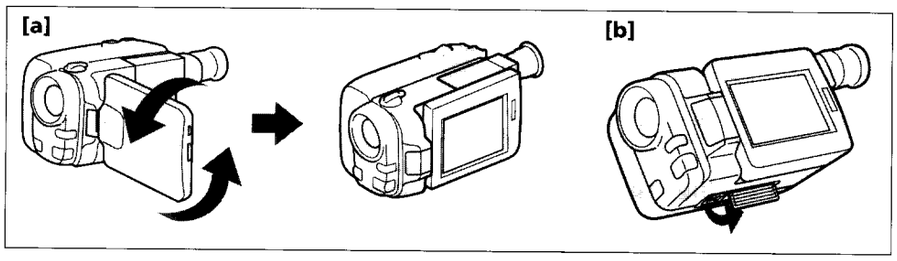
Press ◀◀.

To Fast-forward the Tape

Press ▶▶.

When watching on the LCD screen

Turn the LCD panel vertically until it clicks, turn it over and move back to the body. **[a]**
The stand on the bottom is useful. **[b]**



Note on DISPLAY button

Press DISPLAY to erase the screen indicators on the LCD screen. To display the indicators, press it again.

Using headphones

Connect headphones (not supplied) to the ∩ jack. You can adjust the volume of the headphones using VOLUME.

To view the playback picture in the viewfinder

Close the LCD panel. The viewfinder turns on automatically. When using the viewfinder, you can monitor the sound only by using headphones.
To view on the LCD screen again, open the LCD panel. The viewfinder turns off automatically.

Various Playback Modes

You can enjoy pictures with little noise on the LCD screen during still, slow and picture search.
(CRYSTAL-CLEAR still/slow/picture search)

To View a Still Picture (Playback pause)

Press ❚❚ during playback. To resume playback, press ❚❚ or ▷.

To Locate a Scene (Picture search)

Keep pressing ◀◀ or ▶▶ during playback. To resume normal playback, release the button.

To Monitor the High-speed Picture while Advancing the Tape or Rewinding (Skip scan)

Keep pressing ◀◀ while rewinding or ▶▶ while advancing the tape. To resume normal playback, press ▷.

To View the Picture in a Sequence of Stop-motion Images

Press EDITSEARCH in Playback pause mode. If you keep pressing EDITSEARCH, you can view the picture play back in the forward (+) or reverse (–) direction.

To View the Picture at 1/5 Speed (Slow playback) (only with the Remote Commander)

Press ❚▶ on the Remote Commander during playback. To resume normal playback, press ▶. If slow playback lasts for about 1 minute, it shifts to normal speed automatically.

Notes on playback

- Streaks appear and the sound is muted in the various playback modes.
- When Playback pause mode lasts for 5 minutes, the camcorder automatically enters stop mode.

To select the monitor sound

Change the "HiFi SND" mode setting in the menu system (p. 35).

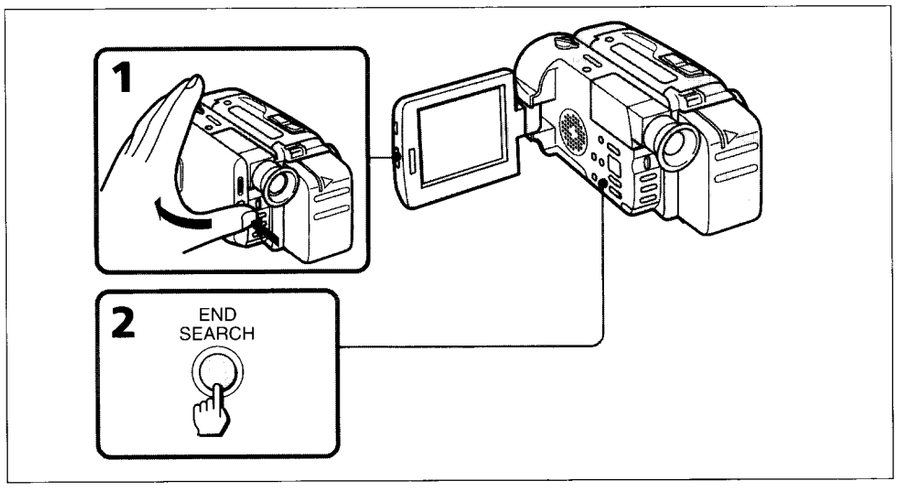
Searching for the End of the Picture

You can go to the end of the recorded portion.
It is convenient when you restart recording after you played back the recorded portion.
This function works when the POWER switch is set to either CAMERA or VTR.

(1) While pressing PUSH OPEN, open the LCD panel. Adjust the angle of the LCD panel or the brightness of the LCD screen if necessary (p. 13).

(2) Press ENDSEARCH after you record and play back the tape. The tape starts rewinding or fast-forwarding and the last 3 seconds of the recorded position plays back. Then the tape stops at the end of the recorded picture. **(End Search)**

End Search function does not work once you eject the cassette after you recorded.



Using Alternate Power Sources

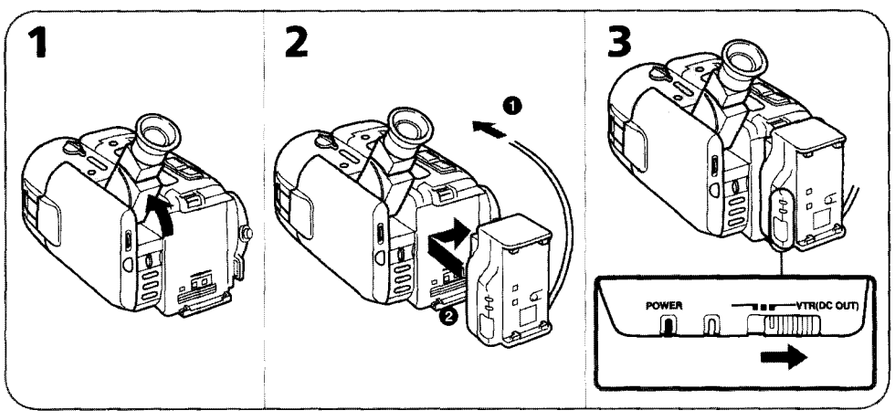
You can choose any of the following power sources for your camcorder: battery pack (p.6), the house current, and 12/24 V car battery. Choose the appropriate power source depending on where you want to use your camcorder.

Place	Power source	Accessory to be used
Indoors	House current	AC power adaptor AC-V26(supplied)
Outdoor	Battery pack	Battery pack NP-66 (supplied), NP-98/98D, NP-80/80D, NP-68, NP-66H, NP-C65, NP-60D
In the car	12 V or 24 V car battery	DC pack DCP-77

Note on power sources
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. If this happens, restore the power supply again immediately.

Using House Current

To use the supplied AC power adaptor:
(1) Lift up the viewfinder.
(2) Connect the AC power cord to a wall outlet. Connect the bottom of the AC power adaptor to the battery mounting surface of the camcorder.
(3) Set the selector to VTR (DC OUT).



WARNING
Power cord must only be changed at qualified service shop.

PRECAUTION
The unit is not disconnected from the AC power source as long as it is connected to the wall outlet, even if the set itself has been turned off.

Notes on the POWER lamp

- The POWER lamp will remain lit for a while even if the unit is unplugged after use. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to VTR (DC OUT) again.

To Remove the Adaptor

The adaptor is removed in the same way as the battery pack (p. 8).

Using a Car Battery

Use the DCP-77 DC pack (not supplied). Connect the cord of the DC pack to the cigarette lighter socket of a car (12 V or 24 V). Connect the DC pack to the battery mounting surface of the camcorder.

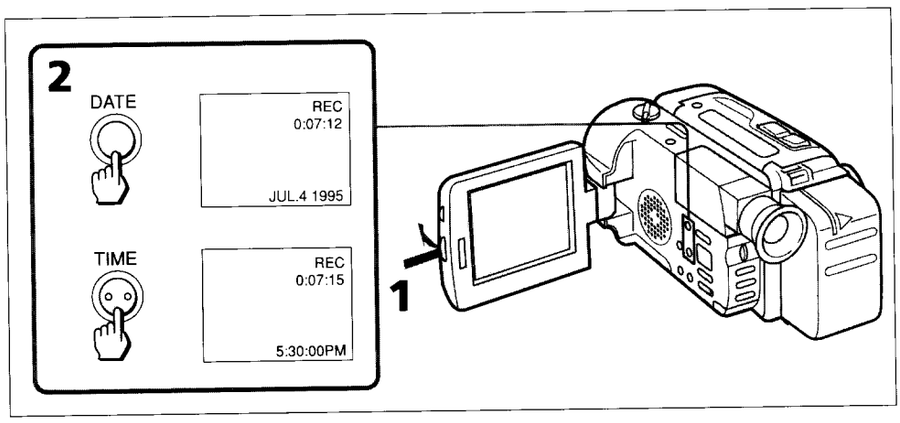
To Remove the DC Pack

The DC pack is removed in the same way as the battery pack (p. 8).

This mark indicates that this product is a genuine product related to our 8mm video equipment.
When purchasing our 8mm video equipment, we recommend that you purchase related 8mm video products provided with the same mark or products provided with our logotype mark.

Recording with the Date or Time

You can record the date or time displayed on the LCD screen or in the viewfinder with the picture. You cannot record the date and time at the same time. Except for the date or time indicator, no indicator on the LCD screen or in the viewfinder is recorded.
The clock is already set to the East Coast Standard Time at the factory. You can reset the clock in the menu system (p.40).
(1) While pressing PUSH OPEN, open the LCD panel.
(2) Press DATE or TIME before you start recording.



To Stop Recording with the Date or Time

Press DATE or TIME again. The date or time indicator disappears. The recording continues without the date or time.

Fade-in and Fade-out

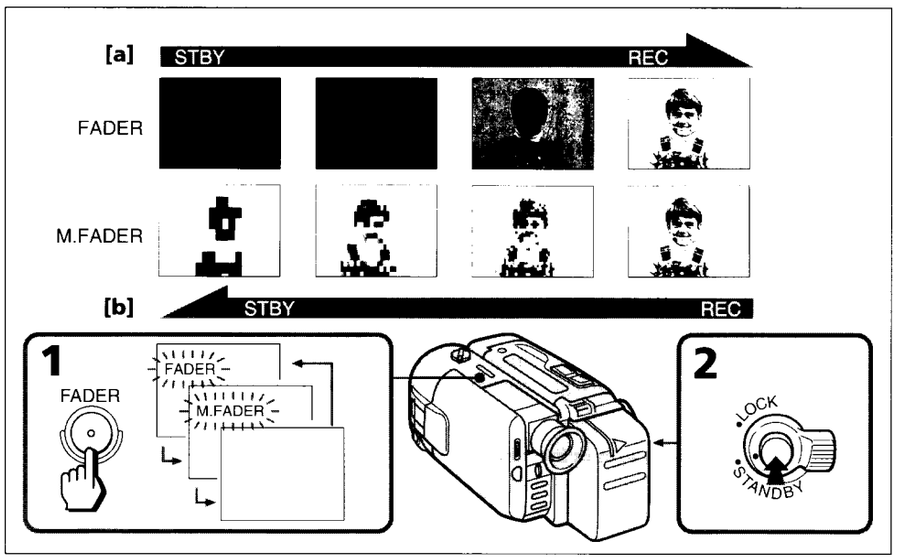
You can fade in or out to give your recording a professional appearance.
When fading in, the picture gradually fades in from black or mosaic while the sound increases. When fading out, the picture gradually fades to black or mosaic while the sound decreases.

When Fading in [a]

(1) While the camcorder is in Standby mode, press FADER. The fade indicator starts flashing.
(2) Press START/STOP to start recording. The fade indicator stops flashing and the picture appears gradually.

When Fading out [b]

(1) During recording, press FADER. The fade indicator starts flashing.
(2) Press START/STOP to stop recording. The fade indicator stops flashing. The picture fades out and then recording stops.



To Cancel the Fade-in/Fade-out Function

Before pressing START/STOP, press FADER until the fade indicator disappears.

When the date/time indicator is displayed

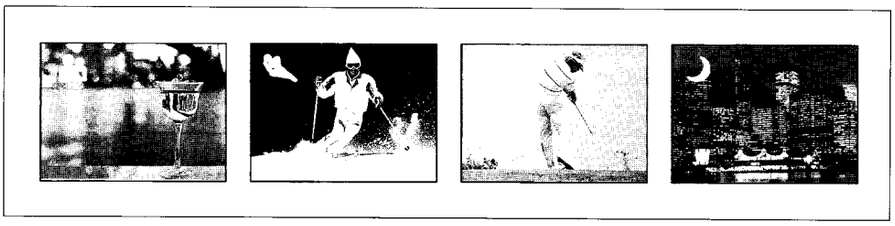
The date/time indicator does not fade in nor fade out.

Using the PROGRAM AE Function

You can select from four PROGRAM AE (Auto Exposure) modes to suit your shooting situation. When you use PROGRAM AE, you can get a Portrait effect (the subject is in focus and the background is out of focus), capture high-speed action or record night views.

Selecting the Best Mode

Select one of four modes, referring to the following.



Portrait mode
- A still subject such as a person or flower
- Zooming in on a subject in the telephoto mode
- A subject behind an obstacle such as a net

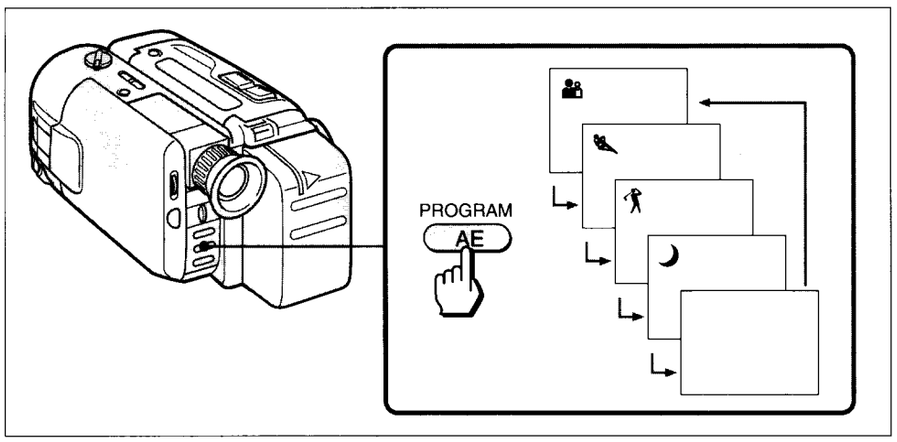
Sports mode
- Outdoor sports scenes such as football, tennis, golf or skiing
- A landscape in a moving car

High-speed shutter mode
- A golf swing or tennis match in fine weather with the ball captured clearly
- Playing back certain scenes with high-speed movements in clear, sharp picture

Twilight mode
Recording night views, neon signs or fireworks

Using the PROGRAM AE Function

Each press of PROGRAM AE changes the mode. Repeat pressing PROGRAM AE until the desired mode appears. The indicator of the selected PROGRAM AE mode appears in the viewfinder or on the LCD screen.



Note on shutter speed

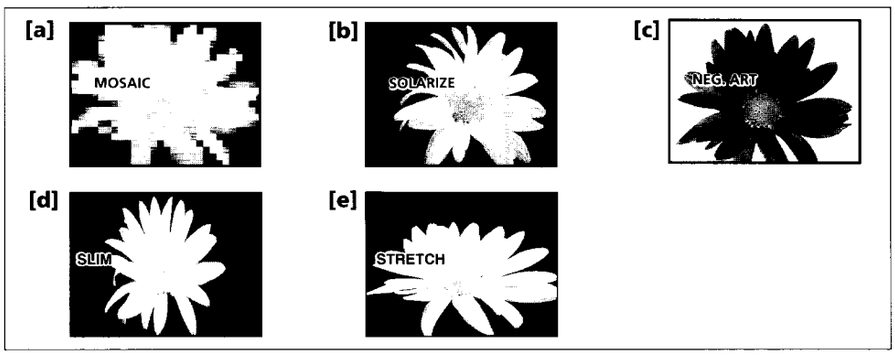
The shutter speed in each PROGRAM AE mode is as follows:
Portrait mode — between 1/60 to 1/2000
Sports mode — between 1/60 to 1/500
High-speed shutter mode — 1/4000
Twilight mode — 1/60

Enjoying Picture Effect

You can make interesting pictures, like those of television with Picture Effect function.

Selecting the Best Modes

Select one of seven modes, referring to the following.



MOSAIC [a]
The picture becomes mosaic.

SOLARIZE [b]
The light intensity is more clear, and the picture looks like a painting.

B&W
The picture is monochrome (black and white).

SEPIA
The picture is sepia.

NEG. ART [c]
The color of the picture is reversed.

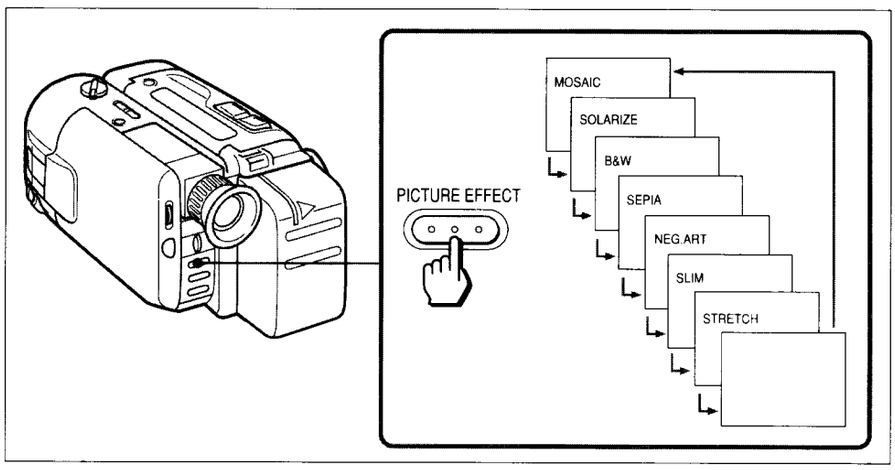
SLIM [d]
The picture becomes slim.

STRETCH [e]
The picture is stretched.

Using the Picture Effect Function

Each press of PICTURE EFFECT changes the mode. Repeat pressing PICTURE EFFECT until the desired mode appears. The indicator of the selected PICTURE EFFECT mode appears in the viewfinder or on the LCD screen.

You can check the changed picture in the viewfinder or on the LCD screen.



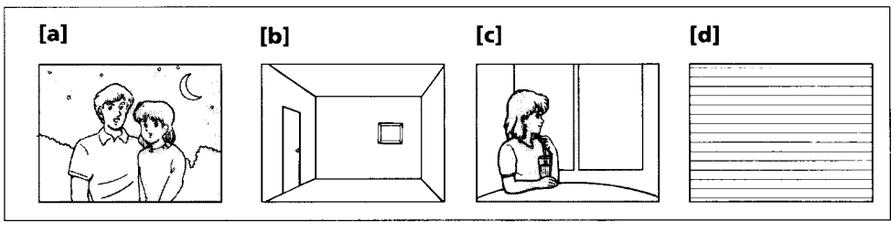
Note on Picture Effect

When you turn the power off, the camcorder returns automatically to normal mode.

Focusing Manually

When to Use Manual Focus

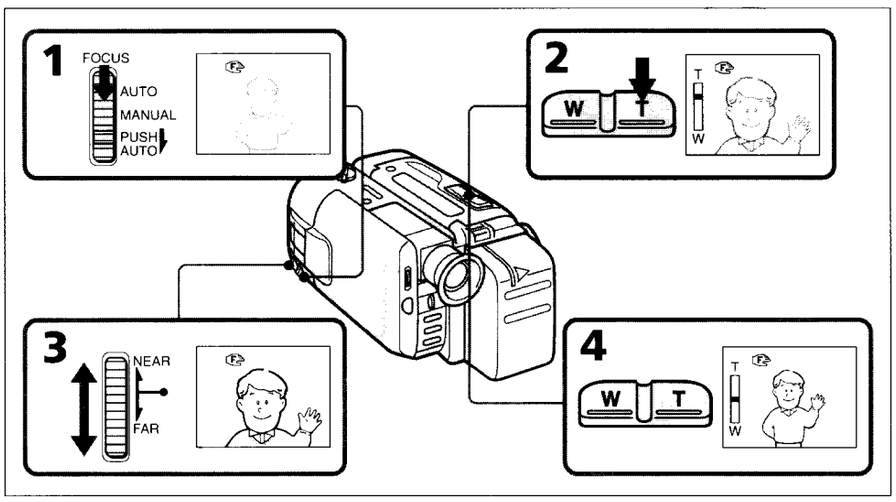
In the following cases you should obtain better results by adjusting the focus manually.



- Insufficient light **[a]**
- Subjects with little contrast — walls, sky, etc.**[b]**
- Too much brightness behind the subject **[c]**
- Horizontal stripes **[d]**
- Bright subject or subject reflecting light
- Shooting a stationary subject when using a tripod

Focusing Manually

When focusing manually, first focus in telephoto before recording, and then reset the shot length.
(1) Set FOCUS to MANUAL. The ☞ indicator appears in the viewfinder or on the LCD screen.
(2) Keep pressing the "T" (telephoto) side of the power zoom button until the zooming stops.
(3) Turn the focus dial to achieve a sharp focus.
(4) Set the desired shot length using the power zoom button.



To Reactivate Auto Focusing

Set FOCUS to AUTO. The ☞ indicator in the viewfinder disappears.

Shooting in relatively dark places

Shoot at wide angles after focusing in telephoto.

Note on the focus dial

The focus dial does not have a stop position.

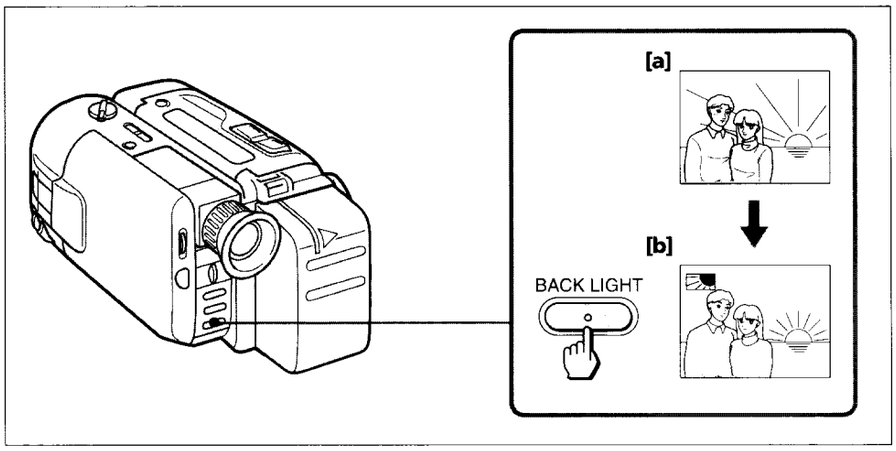
To Shoot with Auto Focusing Momentarily

While shooting with manual focusing, press FOCUS down (PUSH AUTO).
When you release, manual focusing will resume. Use this switch when focusing on one subject to the other for natural focusing.

Shooting with Backlighting

When you shoot a subject with the light source behind the subject or a subject with a light background, use the BACK LIGHT function.

Press BACK LIGHT. The ◪ indicator appears in the viewfinder or on the LCD screen.



[a] Subject is too dark because of backlight.
[b] Subject becomes bright with backlight compensation.

After Shooting

Be sure to release this adjustment condition by pressing BACK LIGHT again. The ◪ indicator disappears. Otherwise, the picture will be too bright under normal lighting condition.

This function is also effective under following conditions:

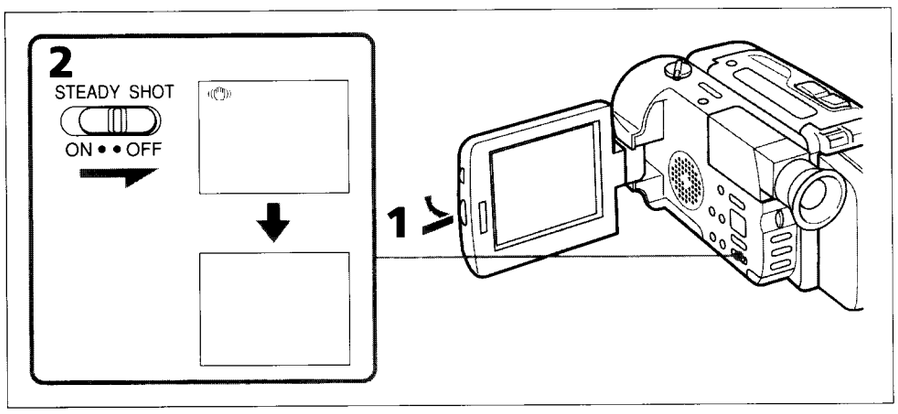
- On snow e.g. at a ski resort
- At the beach under strong sunshine
- A subject with a light source nearby or a mirror reflecting light
- A white subject against a white background. Especially when you shoot a person wearing shiny clothes made of silk or synthetic fiber, his or her face tends to become dark if you do not use this function.

Releasing the STEADY SHOT Function

When you shoot, the indicator appears in the viewfinder or on the LCD screen. This indicates that the Steady Shot function is working and the camcorder compensates for camera-shake.

You can release the Steady Shot function. Do not use the Steady Shot function such as when shooting stationary object with a tripod.

(1) While pressing PUSH OPEN, open the LCD panel.
(2) Set STEADY SHOT to OFF.



To Activate the Steady Shot Function Again

Set STEADY SHOT to ON.

Notes on the Steady Shot function

- The Steady Shot function will not correct excessive camera-shake.
- When you switch the STEADY SHOT, the exposure may fluctuate.

Changing the Mode Settings

You can change the mode settings in the menu system to further enjoy the features and functions of the camcorder.

The menu contents of CAMERA mode are different from those of VTR mode.

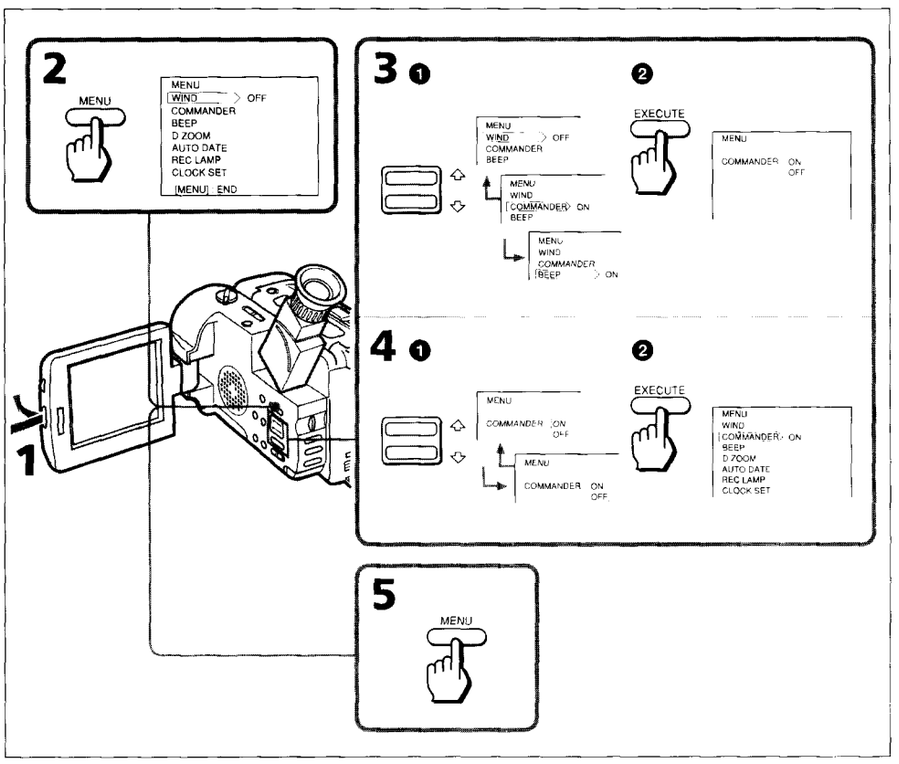
(1) While pressing PUSH OPEN, open the LCD panel.

(2) Press MENU to display the menu on the LCD screen.

(3) Press ↑ or ↓ to select the desired item, then press EXECUTE.

(4) Press ↑ or ↓ to set the desired mode, then press EXECUTE. If you want to change the other modes, repeat steps 3 and 4.

(5) Press MENU to erase the menu display.



Selecting the Mode Setting of Each Item

Items in CAMERA and VTR Modes

COMMANDER <ON/OFF>

- Select ON when using the supplied wireless Remote Commander for the camcorder.
- Select OFF when not using the Remote Commander for the camcorder.

BEEP <ON/OFF>

- Select ON to turn the beep sound on.
- Select OFF to turn the beep sound off.

COLOR*

Select this item and change the level of the indicator by press ↑ or ↓ to adjust the color intensity of the picture when using the LCD.

HUE*

Select this item and change the level of the indicator by press ↑ or ↓ to adjust the tint of the picture when using the LCD.

Items in CAMERA Mode Only

WIND <ON/OFF>

- Select ON to reduce wind noise when recording in strong wind.
- Normally select OFF.

D ZOOM <ON/OFF>*

- Select ON to activate digital zooming.
- Select OFF otherwise. The zooming ability becomes 12 x.

AUTO DATE <ON/OFF>*

- Select ON to record the date for 10 seconds after recording has started. (AUTO DATE feature p. 11).
- Select OFF not to record the date.

REC LAMP <ON/OFF>*

- Select ON to let the camera recording/battery lamp on the front panel light during recording.
- Select OFF not to let it light.

CLOCK SET*

Select this item to reset the date or time (p. 40).

Item for VTR Mode Only

EDIT <ON/OFF>

- Select ON to minimize picture deterioration when editing.
- Normally select OFF.

HiFi SND <STEREO/1/2>

- Normally select STEREO.
- Select 1 or 2 to play back a dual soundtrack tape.

* These settings are retained even when battery is removed, as long as the lithium battery is in place.

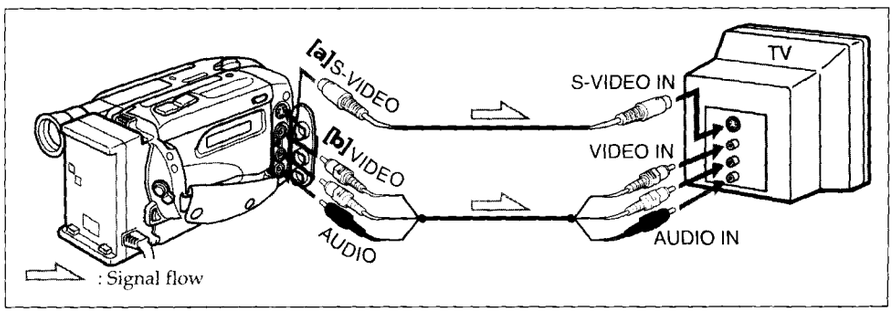
Watching on a TV Screen

You can use the camcorder as a VCR. Connect the camcorder to the TV by using the supplied A/V connecting cable. There are two ways to connect the camcorder to your TV. When monitoring the playback picture by connecting the camcorder to your TV, we recommend you use the house current for the power source (p. 22).

While playing back on a TV screen, close the LCD panel to reduce noise during various playback.

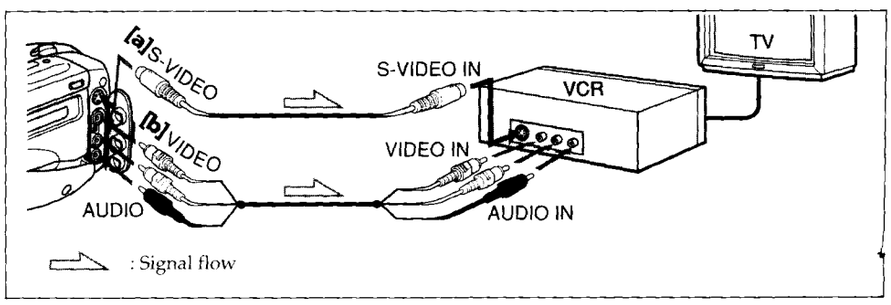
Connecting Directly to a TV

Connect the camcorder to the inputs on the TV by using the supplied A/V connecting cable. Set the TV/VCR selector on the TV to VCR.
If you are going to connect the camcorder using the S video cable **[a]**, you do not need to connect the yellow (video) plug of the A/V connecting cable **[b]**.



If Your VCR is Already Connected to a TV

Connect the camcorder to the LINE IN inputs on the VCR by using the A/V connecting cable. Set the TV/VCR selector on the TV to VCR.



If your TV or VCR is a monaural type

Connect only the white plug for audio on both the camcorder and the TV or the VCR. With this connection, the sound is monaural.

To connect a TV or a VCR without audio/video input jacks

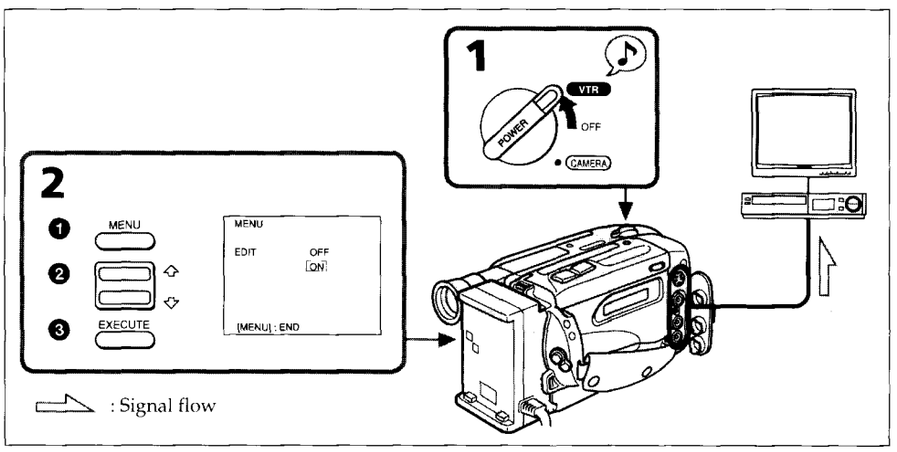
Use an RFU adaptor (not supplied).

Editing onto Another Tape

You can create your own video program by editing with any other 8 mm, Hi8, VHS, S-VHS, VHSC, S-VHSC, or Betamax VCR that has video/audio inputs.

Before Editing

Connect the camcorder to the VCR using the supplied A/V connecting cable (p. 36).
Set the input selector on the VCR to LINE, if available.
(1) Set the POWER switch to VTR.
(2) Set EDIT to ON in the menu system (p. 35).



Starting Editing

Turn down the volume of the camcorder while editing. Otherwise, picture distortion may occur.
(1) Insert a blank tape (or a tape you want to record over) into the VCR and insert your recorded tape into the camcorder.
(2) Play back the recorded tape on the camcorder until you locate the point where you want to start editing, then press ❚❚ to put the camcorder in playback pause mode.
(3) On the VCR, locate the recording start point and put the VCR in recording pause mode.
(4) Press ❚❚ on the camcorder and VCR simultaneously to start editing.

To Edit More Scenes

Repeat steps 2 to 4.

To Stop Editing

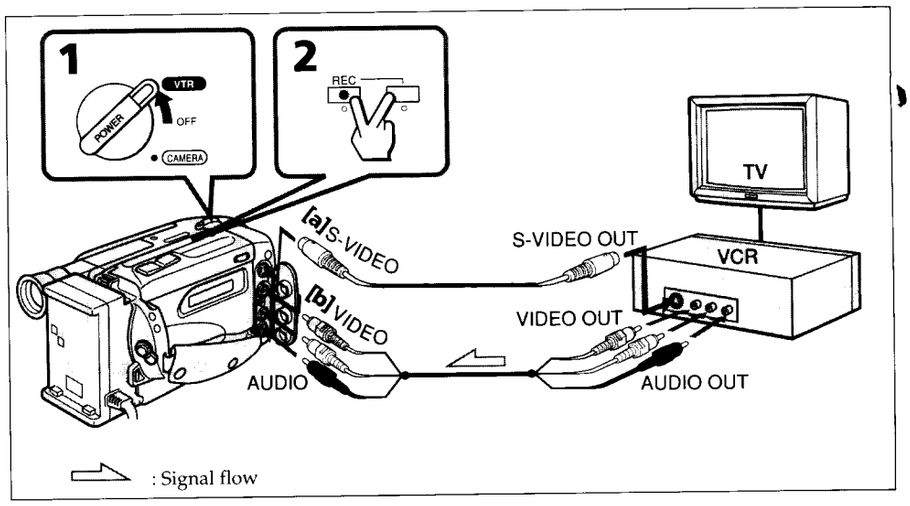
Press □ STOP on both the camcorder and VCR.

Use of the EDITSEARCH button

You can play back the tape in the normal/reverse direction by holding down EDITSEARCH during playback pause mode.
You can also play back still pictures successively at specific intervals by pressing EDITSEARCH intermittently.

Recording from a VCR or TV

You can record a tape from another VCR or a TV program from a TV that has video/audio outputs. Connect the camcorder to the VCR or TV.
Turn down the volume of the camcorder while editing. Otherwise, the picture distortion may occur.
(1) Turn the POWER switch to VTR.
(2) Press REC ● and the button on the right together at the point where you want to start recording.
If you are going to connect the camcorder using the S video cable **[a]**, you do not need to connect the yellow (video) plug of the A/V connecting cable **[b]**.



If your TV or VCR is a monaural type
Connect only the white plug for audio on both the camcorder and the TV or the VCR. With this connection, the sound is monaural.

To Stop Recording

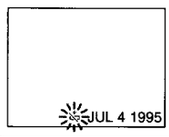
Press □ STOP.

Monitoring the Picture from a TV or VCR

You can monitor the picture on the LCD screen or in the viewfinder. Connect the camcorder to the outputs on the TV or VCR.

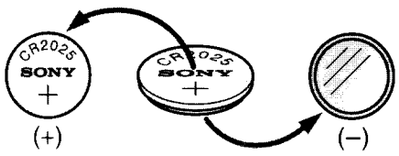
Changing the Lithium Battery in the Camcorder

Your camcorder is supplied with the lithium battery installed. When the battery becomes weak or dead, ⚠ indicator flashes in the viewfinder or on the LCD screen for about 5 seconds when you set the POWER switch to CAMERA. In this case, **replace the battery with the Sony CR2025 or Duracell DL-2025 lithium battery. Use of any other battery may present a risk of fire or explosion.**
The lithium battery for the camcorder lasts for about 1 year under normal operation. However, the lithium battery installed at the factory may not last 1 year.



Note on Lithium Battery

The lithium battery has a positive (+) and a negative (–) side as illustrated.
Be sure to insert the lithium battery with the positive side facing out.

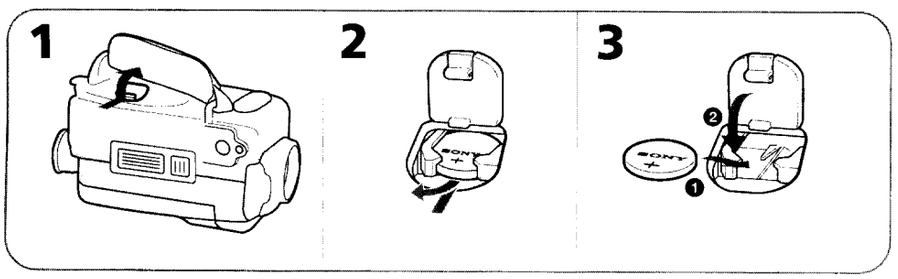


WARNING
The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

Caution
Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

Changing the Lithium Battery

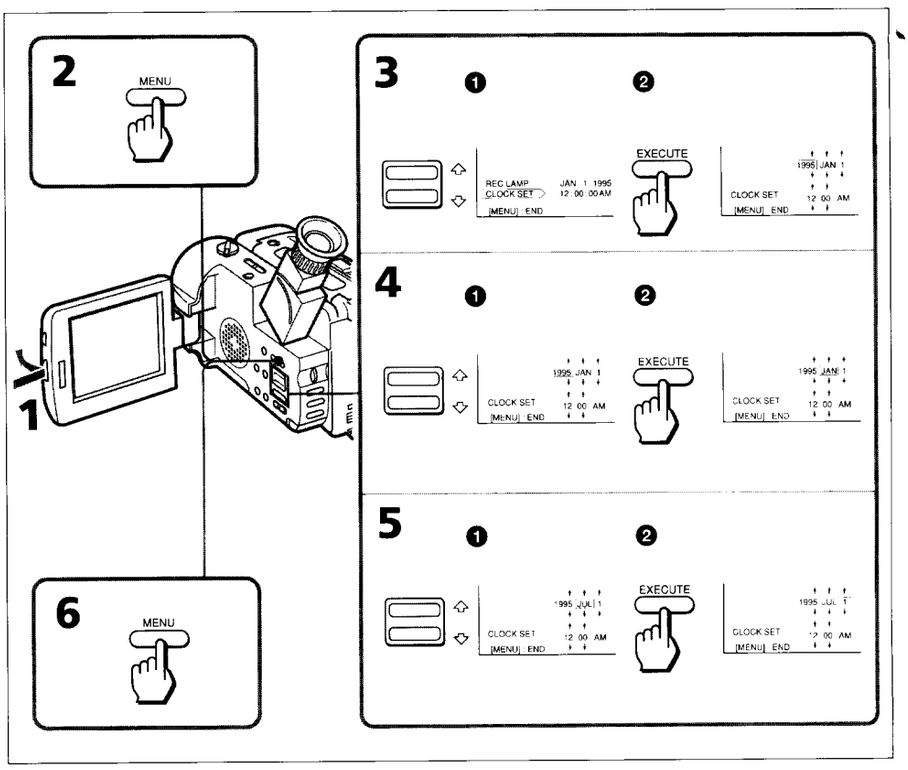
When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date, time and the other items marked with * on page 35.
(1) Open the lid of the lithium battery compartment under the grip strap of the camcorder.
(2) Push the battery down once and pull it out from the holder.
(3) Install the lithium battery with the positive (+) side facing out. Close the lid of the battery compartment.



Resetting the Date and Time

You can reset the date and time in the menu system in CAMERA mode.

(1) While pressing PUSH OPEN, open the LCD panel.
(2) Press MENU to display the menu on the LCD screen.
(3) Press ↑ or ↓ to select CLOCK SET, then press EXECUTE.
(4) Press ↑ or ↓ to adjust the year, and then press EXECUTE.
(5) In the same way as for the year, adjust the month, day, hour and minutes using ↑, ↓ and EXECUTE.
Note that when you hold down ↑ or ↓, the indications in the menu display advance faster.
(6) Press MENU to erase the menu display.



To Correct the Date and Time Setting

Repeat steps 4 to 5.

To Check the Date and Time

Press DATE to display the date indicator.
Press TIME to display the time indicator. When you press the same button again, the indicator goes out.

Note on the setting of the year

When you set the year, each time you press ↑ or ↓, the digits change as follows:

1995 ⟷ 1996 ⋯→ 2025

Note on the time indicator

The internal clock of the camcorder operates on a 12-hour cycle.
12:00:00 AM stands for midnight.
12:00:00 PM stands for noon.

Playback Modes

Selecting Cassette Types

This Hi8 system is an extension of the standard 8 mm system, and was developed for higher-quality pictures.
You can use Hi8 video and standard 8 mm cassettes. When you want to record in the Hi8 system, use only Hi8 video cassettes. You cannot record on standard 8 mm cassettes in the Hi8 system.
If you are going to play back the tape using a standard 8 mm video recorder/player, you should record in the standard 8 mm tape.

To play back in	Recording using cassette type
Hi8	Hi8
Standard 8	8

When You Play Back

The playback mode (SP or LP) is selected automatically according to the format in which the tape has been recorded. The quality of the recorded picture in LP mode, however, will not be as good as that in SP mode.

Notes on AFM Hi-Fi stereo

When you play back the tape, the sound is in monaural if:

- You record the tape using this camcorder, then play it back on an AFM Hi-Fi monaural video recorder/player.
- You record the tape on an AFM Hi-Fi monaural video recorder, then play it back on this camcorder.

LP (long play) mode

When you play back a tape recorded in LP mode, the LP indicator lights up in the viewfinder or on the LCD screen.

Foreign 8 mm video

You cannot play software recorded on a different TV color system. Because the TV color systems differ from country to country, you may not be able to play back foreign prerecorded software. Refer to page 49 to check the TV color system of foreign countries.

Tips for Using the Battery Pack

This section shows you how you can get the most out of your battery pack.

Preparing the Battery Pack

Always Carry Additional Batteries

Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

Battery Life is Shorter in Cold Environment

Battery efficiency is decreased and the battery will be used up more quickly if you are recording in cold environment.

To Save Battery Power

Turn the STANDBY switch on the camcorder down when not recording to save battery power.
A smooth transition between scenes can be made even if recording is stopped and started again.
While you are positioning the subject, selecting an angle, or looking through the viewfinder lens or on the LCD screen, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

When to Replace the Battery Pack

While you are using your camcorder, the remaining battery indicator in the viewfinder or on the LCD screen decreases gradually as battery power is used up.

When the remaining battery indicator reaches the lowest point, the ⌧ indicator appears and starts flashing in the viewfinder or on the LCD screen. (**[a]** on the next page)
When the ⌧ indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, turn the POWER switch to OFF on the camcorder and replace the battery pack. Leave the tape in the camcorder to obtain smooth transition between scenes after the battery pack is replaced.

Note on the remaining battery indicator

The remaining battery indicator of the camcorder may indicate a different remaining capacity from that of the battery pack with its own indicator (not supplied). The indicator on the battery pack is more accurate.

Notes on the Rechargeable Battery Pack

The Battery Pack Heats Up

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

Battery Pack Care

- **Remove the battery pack from the camcorder after using the battery pack**, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is set to OFF, which shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Therefore, you should charge the battery right before using the camcorder.

How to Use the Switch on the Battery Pack

This switch is provided so that you can mark the charged battery pack. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up (or in whichever direction you want to remind yourself). **[b]**

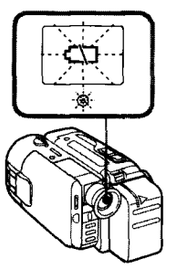
The Life of the Battery Pack

If the ⌧ indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Charging Temperature

You should charge batteries at temperatures from 50°F to 86°F (from 10°C to 30°C). Lower temperatures require a longer charging time.

[a]



[b]

Tips for Using the Battery Pack

Notes on Charging

A Brand-new Battery Pack

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

Before Recharging a Used Battery Pack

- Make sure to use up the battery before recharging.
- If recording is completed before the ⌧ indicator appears in the viewfinder or on the LCD screen, you should remove the tape, turn the POWER switch to CAMERA, turn STANDBY up, and leave the camcorder until the battery indicator flashes rapidly.
- **Charging the usable battery causes a lowering of battery capacity. Battery capacity can be recovered if you fully discharge and charge the battery pack again.**

After Long Storage

Recharge the battery pack after a long period of storage. If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

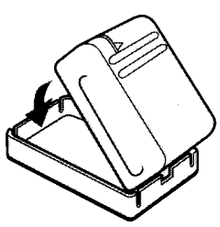
Notes on the Terminals

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.
When the terminals are not clean or when the battery pack has not been used for a long time, repeatedly install and remove the battery pack. This improves the contact condition. Also, wipe the + and – terminals with a soft cloth or paper.

Be Sure to Observe the Following

- To prevent an accident caused by a short circuit, do not allow metal objects such as necklace to touch the battery terminals. When carrying the battery pack, attach the terminal cover. **[c]**
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

[c]



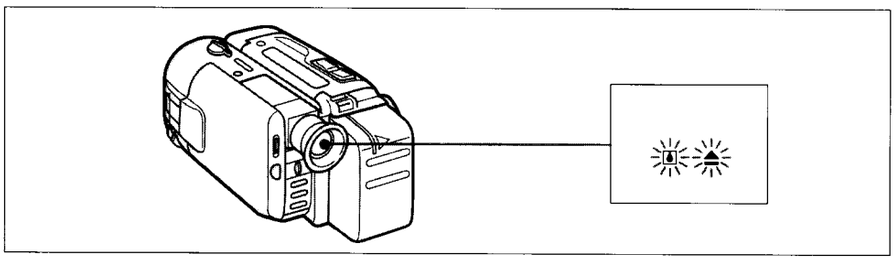
Maintenance Information and Precautions

Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the camcorder may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

Inside the Camcorder

When ◘ and ⏏ indicators flash in the viewfinder or on the LCD screen, moisture has condensed inside the camcorder.
If this happens, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder, and leave it with the cassette holder open for at least one hour.
The camcorder can be used again if the ◘ indicator does not appear when the power is turned on again.



On the Surface of the Tape

If there is moisture on the surface of the tape, when you insert cassette and press a tape transport button (▷PLAY, etc.), the ⏏ indicator in the viewfinder or on the LCD screen flashes.
In this case, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least one hour.
The camcorder can be used again if the ⏏ indicator does not appear when you insert the cassette and press one of the tape transport button.

On the Lens

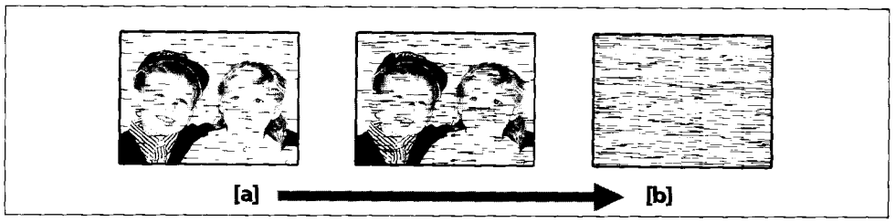
If moisture condenses on the lens, no indicator appears, but the picture becomes dim. Turn off the power and do not use the camcorder for about one hour.

How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.
(1) Be sure to tightly seal the plastic bag containing the camcorder.
(2) Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about 1 hour).

Video Head Cleaning

To ensure normal recording and clear pictures, clean the video heads. When the ⊗ indicator and "🧹 CLEANING CASSETTE" message appear one after another in the viewfinder or on the LCD screen or playback pictures are "noisy" or hardly visible, the video heads may be dirty.



[a] Slightly dirty
[b] Very dirty

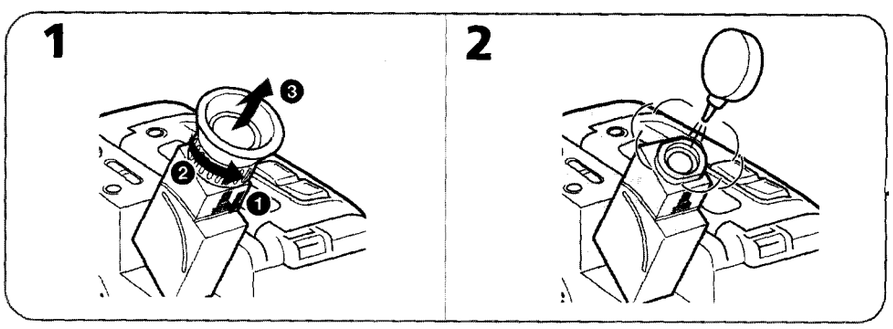
If this happens, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy", repeat the cleaning. (Do not repeat cleaning more than 5 times.)

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note
If the V8-25CLH cleaning cassette is not available in your area, consult your nearest Sony dealer.

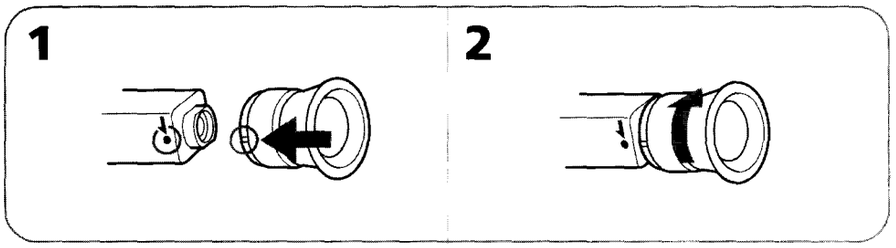
Removing Dust from Inside the Viewfinder

(1) While holding down RELEASE on the viewfinder barrel, turn the eyecup in the direction of the arrow and pull it out.
(2) Clean the surface with a commercially available blower.



To Reattach the Eyecup

(1) Align the groove on the eyecup with the • mark on the barrel.
(2) Turn the eyecup clockwise.



Precautions

Camcorder Operation

- Operate the camcorder using 6.0 V (battery pack) or 7.5 V (AC power adaptor).
- For DC or AC operation, use only the accessories recommended in this manual.
- Should any solid object or liquid get inside the casing, unplug the camcorder and have it checked by your nearest Sony dealer before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF when not using the camcorder.
- *Do not wrap up the camcorder and operate it since heat may build up internally.*
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- Do not push the LCD screen.
- If the camcorder is used in a cold place, a residual image may appear on the LCD screen. This is not a malfunction.
- While using the camcorder, the back of the LCD screen may heat up. This is not a malfunction.
- Constant bright points of light (red, blue, or green) may appear on the LCD screen. This is not a malfunction.

On Handling Tapes

Do not insert anything in the small holes on the rear of the cassette. These holes are used to sense the type and thickness of tape, or if the tab is out or in.

Camcorder Care

- When the camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on the lens, remove them with a soft cloth.
- Clean the camcorder body with a soft dry cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.
- Clean the LCD screen with the supplied LCD screen cleaner cloth to remove fingerprints.

AC Power Adaptor

Charging

- **Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.**
- Charge the battery pack on a flat surface without vibration.
- The battery pack will be hot during charging. This is normal.

Others

- Unplug the unit from the wall outlet (mains) when not in use for a long time. To disconnect the cord (mains lead), pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Do not bend the AC power cord (mains lead) forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or an electrical shock.
- Be sure that nothing metallic comes into contact with the metal parts. If this happens, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
- The unit becomes warm while in use. This is normal.
- Do not place the unit in locations that are:
  - Extremely hot or cold
  - Dusty or dirty
  - Very humid
  - Vibrating

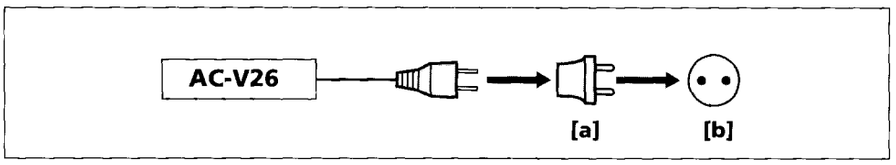
If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

Using Your Camcorder Abroad

Each country has its own electricity and TV color systems. Before using your camcorder abroad, check the following points:

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz. Use a commercially available AC plug adaptor **[a]**, if necessary, depending on the design of the wall outlet **[b]**.



Difference in Color Systems

This camcorder is an NTSC system based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system based TV. When you want to use a PAL-M system based TV, you will need an NTSC/PAL-M transcorder.
Check the following alphabetical list.

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M system country
Brazil

PAL-N system countries
Argentina, Paraguay, Uruguay

SECAM system countries
Bulgaria, Czech Republic, France, Guyana, Hungary, Iran, Iraq, Monaco, Poland, Russia, Slovak Republic, Ukraine, etc.

Trouble Check

If you run into any problem using the camcorder, use the following table to troubleshoot the problem. Should the difficulty persist, disconnect the power source and contact your Sony dealer or local authorized Sony service facility.

Camcorder

	Symptom	Cause	Corrective Actions	Page
Power	The power is not on.	The battery pack is not attached.	Attach the battery pack.	8
		The battery is dead.	Use a charged battery pack.	6
		The AC power adaptor is not connected to a wall outlet.	Connect the AC power adaptor to a wall outlet.	22
	The power goes off.	While being operated in CAMERA mode, the camcorder has been in the Standby mode for more than 5 minutes.	Turn STANDBY down once and turn it up again.	11
		The battery is dead.	Use a charged battery pack.	6
	The battery pack is quickly discharged.	The ambient temperature is too low.	—	42
		The battery pack has not been charged fully.	Charge the battery pack again.	6
		The battery pack is completely dead, and cannot be recharged.	Use another battery pack.	43
	The beep sounds continuously when the battery is attached.	The battery is discharged during a long period of storage.	Charge the battery pack again.	6
Operation	START/STOP does not operate.	The tape is stuck to the drum.	Eject the tape.	9
		The tape has run out.	Rewind the tape or use a new one.	18
		The POWER switch is set to VTR.	Set it to CAMERA.	10
		The tab on the cassette is out (red).	Use a new tape or slide the tab.	9
	The cassette cannot be removed from the holder.	The battery is dead.	Use a charged battery pack or the AC power adaptor.	6, 22
	No function except for cassette ejection works.	Moisture condensation has occurred.	Remove the cassette and leave the camcorder for at least an hour.	45
	The tape does not move when a tape transport button is pressed.	The POWER switch is set to CAMERA or OFF.	Set it to VTR.	18
		The tape has run out.	Rewind the tape or use a new one.	18
	The date or time indicator is flashing.	You pressed DATE and TIME together for more than 2 seconds.	The camcorder is not malfunctioning. You may start recording. Flashing will stop soon.	—
	The recording lamp on the front does not light during recording.	REC LAMP is set to OFF in the menu system.	Set it to ON.	35
	The STEADY SHOT function does not activate.	STEADY SHOT is set to OFF.	Set STEADY SHOT to ON.	33

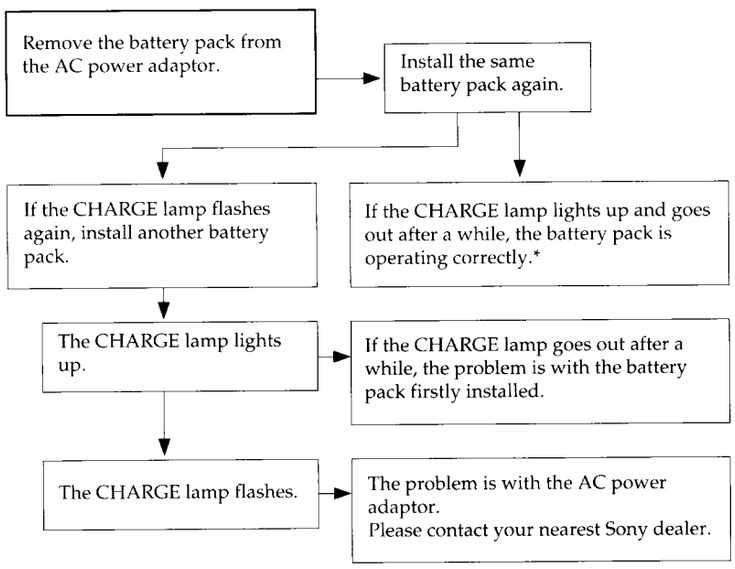
	Symptom	Cause	Corrective Actions	Page
Operation	The autofocusing function does not activate.	Shooting conditions are not suitable for autofocusing operation.	—	30
		The FOCUS switch is set to MANUAL.	Set to AUTO.	31
		The lens is dirty.	Clean the lens with a dry, soft cloth.	47
Picture/Sound	No sound or only a low sound is heard when playing back a tape.	The stereo tape is played back with HiFi SND set to "1" or "2" in the menu system.	Set to "STEREO" in the menu system.	35
	Excessive high-pitched sound is heard.	The picture has been recorded with WIND set to ON in the menu system.	When there is no wind, set it to OFF.	35
	The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.	11
	A vertical band appears when a subject such as lights or a candle frame is shot against a dark background.	The contrast between the subject and background is too high.	The camcorder is not malfunctioning. Change locations.	—
	The playback picture is not clear.	EDIT is set to ON in the menu system.	Set it to OFF.	35
	The picture is "noisy".	The video heads may be dirty.	Clean the heads using Sony V8-25CLH cleaning cassette.	46
	The picture does not appear in the viewfinder.	The LCD panel is open.	Close the LCD panel.	14
	The picture does not appear on the LCD screen.	Incorporated fluorescent tube is worn out.	Please contact your nearest Sony dealer.	—
	An unknown picture is displayed.	The camcorder operates in Demo mode.	Exit the Demo mode.	60
Others	The supplied Remote Commander does not work.	COMMANDER is set to OFF in the menu system.	Set it to ON.	35
		Something is blocking the infrared rays.	Remove the obstacle.	—
		The battery in the Remote Commander is not inserted with the correct polarity.	Insert the battery with the correct polarity.	59
		The batteries are dead.	Insert new ones.	59
	There is dust in the viewfinder.	—	Detach the eyecup and clean the viewfinder lens.	46

AC Power Adaptor

	Symptom	Cause	Corrective Actions	Page
AC power adaptor	The POWER lamp does not light.	—	Set the selector to the centre position and disconnect the mains lead. After about one minute, try again.	6
	The CHARGE lamp flashes.	See the following chart.		

When the CHARGE Lamp Flashes

Check through the following chart.


Remove the battery pack from the AC power adaptor.
Install the same battery pack again.
If the CHARGE lamp flashes again, install another battery pack.
If the CHARGE lamp lights up and goes out after a while, the battery pack is operating correctly.*
The CHARGE lamp lights up.
If the CHARGE lamp goes out after a while, the problem is with the battery pack firstly installed.
The CHARGE lamp flashes.
The problem is with the AC power adaptor.
Please contact your nearest Sony dealer.

* If you use a battery pack which you have just bought or which has been left unused for a long time, the CHARGE lamp may flash at the first charging. But this is not a problem. Repeat again to charge with the same battery pack.

Specifications

Video Camera Recorder

System

Video recording system
Two rotary heads, Helical scanning, FM system

Audio recording system
Rotary heads, FM system

Video signal
NTSC color, EIA standards

Usable cassette
8 mm video format cassette (Hi8 or standard 8mm)

Tape speed
SP mode: Approx. 19/32 inches (1.43 cm)/second
LP mode: Approx. 5/16 inches (0.72 cm)/second
LP mode is for playback only.

Recording/Playback time
SP mode: 2 hours (E6/P6-120)
LP mode: 4 hours (E6/P6-120)
LP mode is for playback only.

Fastforward/rewind time
Approx. 6 min. 30 sec. (E6/P6-120)

Image device
CCD (Charge Coupled Device)

Viewfinder
Electronic viewfinder (monochrome)

Lens
24 x (digital)
12 x (optical)
Combined power zoom lens, Filter diameter 1 1/2 inches (37 mm), TTL autofocus system inner focus wide macro system

Focal distance
7/32 – 2 5/8 inches (5.4 – 64.8 mm)
9/32 – 3 1/8 inches (6.5 – 78 mm) when recording
1 7/8 – 22 1/4 inches (47 – 564 mm) when converted into a 35 mm still camera

Colour temperature
Auto

Minimum illumination
3 lx at F1.8

Illumination range
3 to 100,000 lx

Recommended illumination
More than 100 lx

LCD screen

Picture
4 inches measured diagonally
3 1/4 x 2 3/8 inches
(80.6 x 58.9 mm)

On-screen display
TN LCD/TFT active matrix method
Total dot number:
112,086 (479 x 234)

Input and Output connectors

S video input/output
4-pin mini DIN
Luminance signal: 1 Vp-p, 75 Ω, unbalanced, sync negative
Chrominance signal: 0.3 Vp-p, 75 Ω, unbalanced

Video input/output
Phono jack, 1 Vp-p, 75 Ω, unbalanced, sync negative

Audio input/output
Phono jack
Input: 327 mV, input impedance 47 kΩ)
Output: 327 mV, (at load impedance 47 kΩ), Impedance less than 2.2 kΩ

RFU DC OUT jack
Special minijack, DC 5 V

Headphones jack
Stereo minijack (ø3.5 mm)

LANC jack
Stereo mini-minijack (ø2.5 mm)

MIC jack
Stereo minijack, 0.388 mV low impedance with 2.5 to 3 V DC, output impedance 6.8 kΩ (ø 3.5 mm)

Speaker
Dynamic-speaker

General

Power requirements
On battery mounting surface 6.0 V (battery pack), 7.5 V (AC power adaptor

Average power consumption
7.9 W

Installation
Vertically, Horizontally

Operating temperature
32 °F to 104 °F (0 °C to 40 °C)

Storage temperature
–4 °F to +140 °F (–20 °C to +60 °C)

Dimensions
Approx. 5 x 4 3/8 x 8 3/8 inches (w/h/d) (126 x 110 x 211 mm)

Mass
Approx. 2 lb 8 oz (1.2 kg), excluding the battery pack, lithium battery, cassette and shoulder strap
Approx. 3 lb 5 oz (1.5 kg), including the battery pack NP-66, lithium battery CR2025, cassette E6-120 and shoulder strap

Microphone
Electret condenser microphone, stereo type

Supplied accessories
See page 5.

AC power adaptor

Power requirements
110 – 240 V AC, 50/60 Hz

Power consumption
18 W

Output voltage
DC OUT: 7.5V, 1.8 A
Battery charge terminal:
10 V, 1.1 A in charge mode

Application
Sony battery packs NP-66, NP-60D, NP-C65, NP-66H, NP-68, NP-80/80D, NP-98/98D

Operating temperature
32 °F to 104 °F (0 °C to 40 °C)

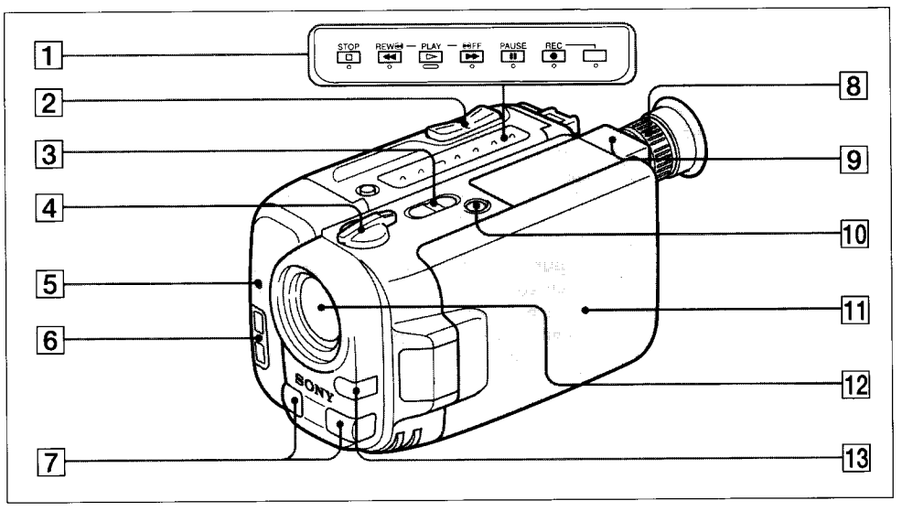
Storage temperature
–4 °F to +140 °F (–20 °C to +60 °C)

Dimensions
Approx. 4 1/8 x 1 13/16 x 2 1/2 inches (103 x 49 x 63 mm) including projecting parts and controls

Mass
Approx. 10 oz (300 g)

Design and specifications are subject to change without notice.

Identifying the Parts



1 Tape transport buttons (p. 18, 32)
□ STOP
◀◀ REW (rewind)
▷ PLAY (playback)
▶▶ FF (fast-forward)
II PAUSE
● REC
These buttons will function in VTR mode.

2 Power zoom button (p. 12)

3 EDITSEARCH button (p. 17)

4 POWER switch (p. 10, 18)

5 Camera recording/battery lamp (p. 35)

6 Power zoom button (p. 13)
It is useful when recording in low position.

7 Built-in microphone

8 Viewfinder adjustment ring (p. 11)

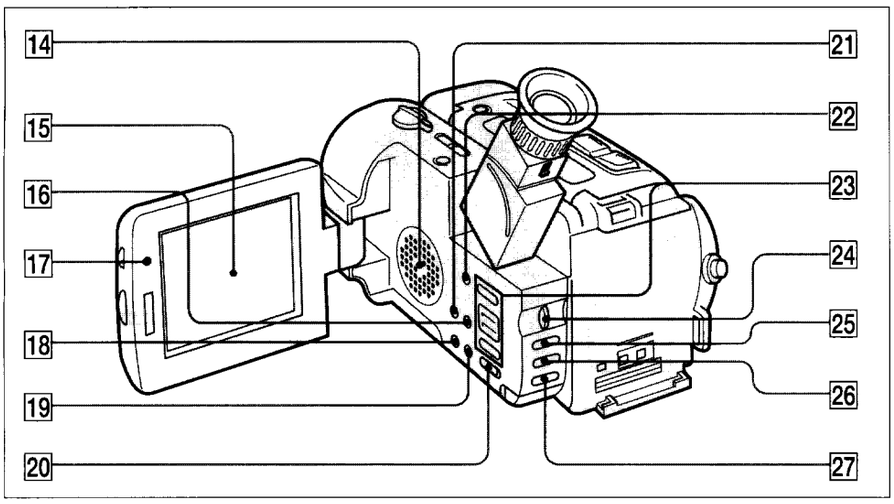
9 Viewfinder (p. 11, 46, 61)

10 FADER button (p. 25)

11 LCD panel (p. 13)

12 Lens cover

13 Remote sensor (p. 60)
Aim the Remote Commander here for remote control.



14 Speaker

15 LCD screen (p. 18, 61)

16 TIME button (p. 24)

17 Recording lamp (p. 13)

18 DISPLAY button (p. 19)

19 END SEARCH button (p. 21)

20 STEADY SHOT switch (p. 33)

21 COUNTER RESET button (p. 11)

22 DATE button (p. 24)

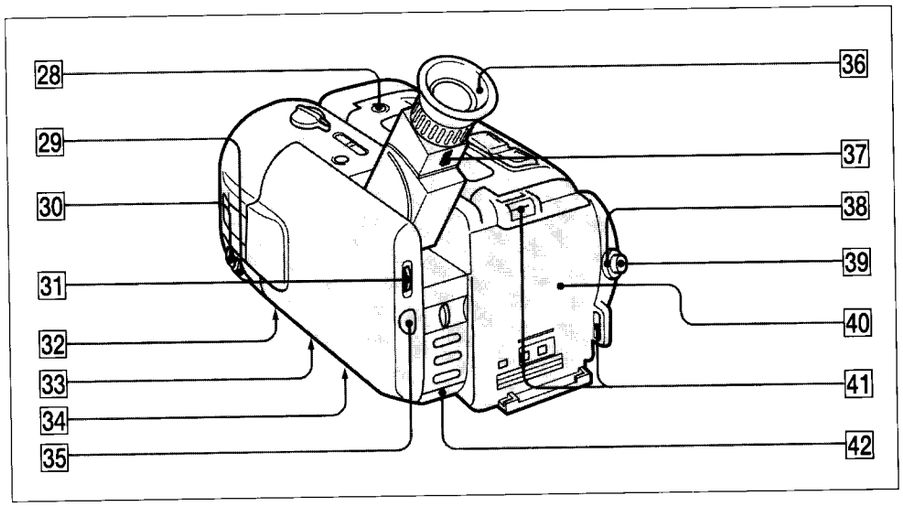
23 MENU operation buttons (p. 34, 40)

24 VOLUME control (p. 18)

25 PICTURE EFFECT button (p. 29)

26 PROGRAM AE button (p. 27)

27 BACK LIGHT button (p. 32)



28 **START/STOP button (p. 13)**
It is useful when recording in low position.

29 **FOCUS switch (p. 31)**

30 **Focus dial (p. 31)**

31 **LCD BRIGHT dial (p. 13)**

32 **Tripod receptacle (p. 19)**
Attach the supplied tripod adaptor so that a tripod (not supplied) can be attached in good balance.

33 **Stand (for recording) (p. 16)**

34 **Stand (for playback) (p. 19)**

35 **PUSH OPEN button (p. 13, 18)**

36 **Eyecup**

37 **RELEASE (viewfinder release) knob (p. 46)**

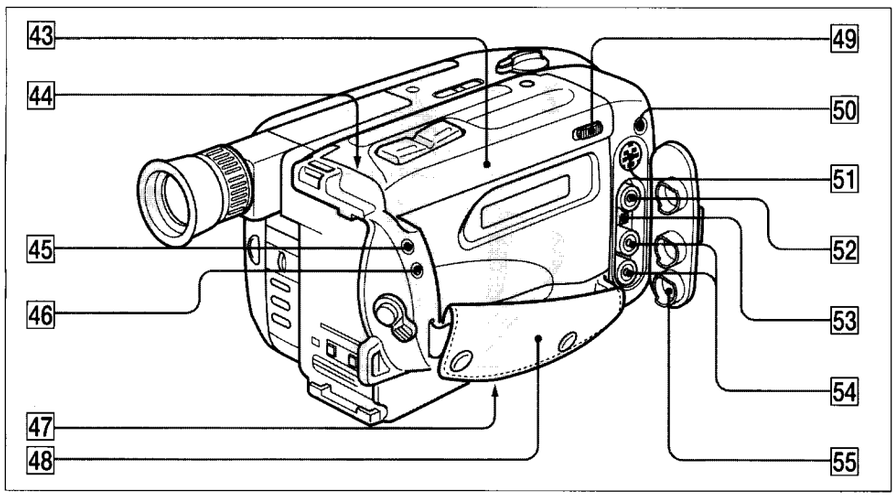
38 **STANDBY switch (p. 10)**

39 **START/STOP button (p. 10)**

40 **Battery mounting surface (p. 8)**

41 **Hooks for shoulder strap (p. 58)**

42 **BATT (battery release) knob (p. 8)**



43 Cassette compartment lid (p. 9)

44 EJECT button (under the lid) (p. 9)

45 LANC ⏲ control jack
Connect the LANC ⏲ connecting cable to a wired remote control unit such as an editing controller. In this case, set the COMMANDER mode to OFF in the menu system (p. 35).
⏲ stands for Local Application Control Bus system. The ⏲ control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the connectors indicated as CONTROL L or REMOTE.

46 ∩ (headphones) jack (p. 19)

47 Lithium battery compartment (p. 39)

48 Grip strap (p. 15)

49 Lid release knob (p. 9)

50 MIC (microphone) jack
Connect an optional external microphone.This jack also accepts a "plug-in-power" microphone.

51 S VIDEO jack (p. 36, 38)

52 VIDEO jack (p. 36, 38)

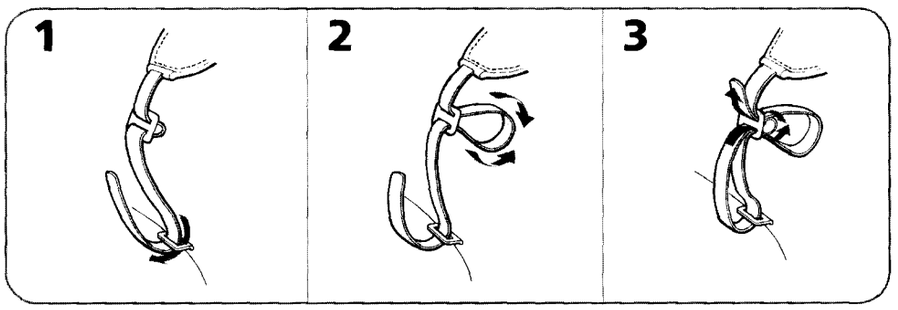
53 RFU DC OUT (RFU adaptor DC out) jack

54 AUDIO jacks (p. 36, 38)

55 Jack cover

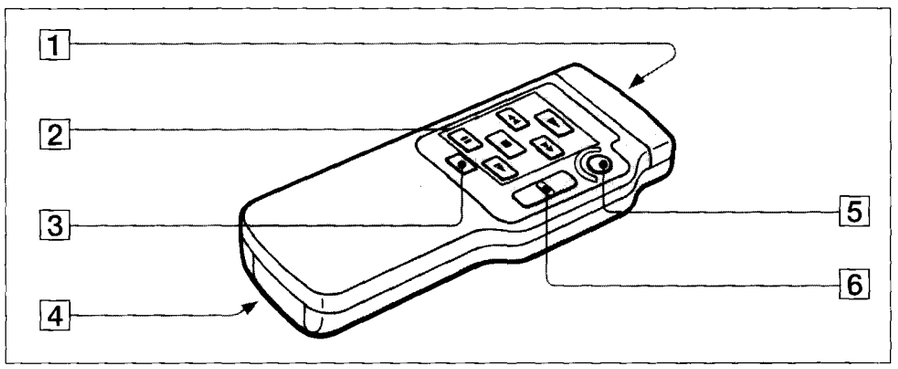
Attaching the shoulder strap

Attach the supplied shoulder strap to the hooks for the shoulder strap (41 on page 56).



Remote Commander

The buttons that have the same name on the Remote Commander and on the camcorder function identically.



1 **Transmitter**
Point toward the remote sensor to control the camcorder after turning on the POWER switch on the camcorder.

2 **Tape transport buttons (p. 18, 20)**

3 **DISPLAY button (p. 19)**

4 **Size AA (R6) battery holder**

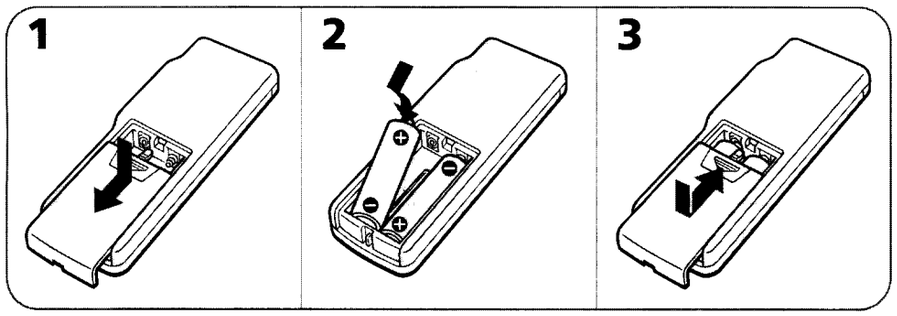
5 **START/STOP button**

6 **Power zoom button**
The zooming speed is unchangeable on the Remote Commander.

Preparing the Remote Commander

To use the Remote Commander, you must insert two size AA (R6) batteries. Use the supplied size AA (R6) batteries.

(1) Remove the battery cover from the Remote Commander.
(2) Insert both of the size AA (R6) batteries with correct polarity.
(3) Put the battery cover back onto the Remote Commander.



Note on battery life

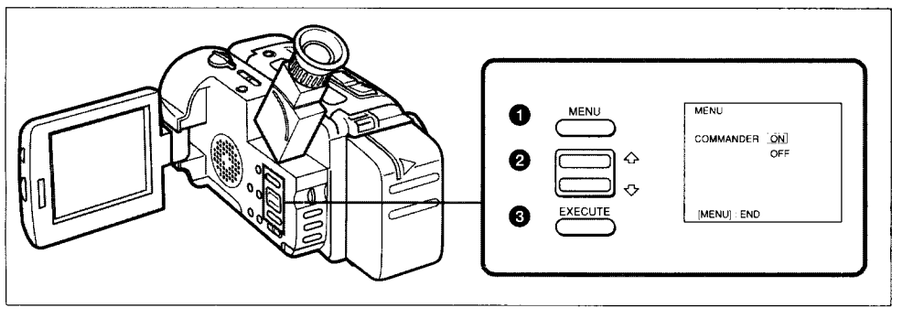
The battery for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

To avoid damage from possible battery leakage

Remove the batteries when you will not use the Remote Commander for a long time.

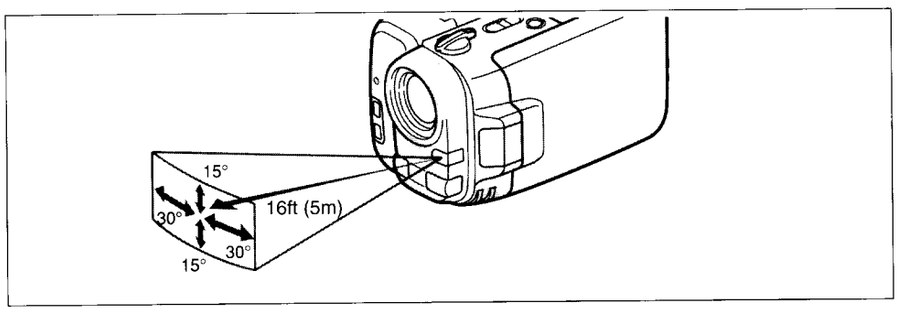
Using the Remote Commander

Make sure that the COMMANDER mode is set to ON in the menu system (p. 35).



Remote Control Direction

Aim the Remote Commander to the remote sensor within the range as shown below.



Notes on the Remote Commander

- Keep the remote sensor away from strong light sources, such as direct sunlight or illumination. Otherwise, the remote control may not be effective.
- Be sure that there is no obstacle between the remote sensor and the Remote Commander.
- This camcorder works at commander mode VTR 2. The commander mode (1, 2, and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.

To Watch the Demonstration

You can watch a brief demonstration of pictures with special effects.
If the demonstration appears when you turn on the camcorder for the first time, exit the Demo mode to use your camcorder.

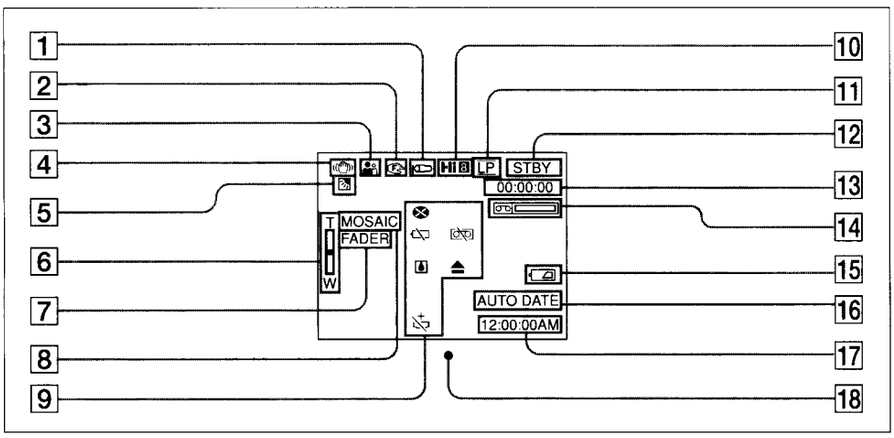
To enter Demo mode

(1) Remove the cassette and turn the POWER switch to OFF.
(2) Turn STANDBY up.
(3) While holding down ▷ PLAY, turn the POWER switch to CAMERA. Demonstration starts.
If a cassette is inserted, the demo mode stops. Note that once you enter demo mode, this mode is retained as long as the lithium battery is in place. Therefore demonstration starts automatically 10 minutes later every time you turn the POWER switch to CAMERA or 10 minutes after the cassette has been removed.

To exit Demo mode

(1) Turn the POWER switch to OFF.
(2) Turn STANDBY up.
(3) While holding down □ STOP, turn the POWER switch to CAMERA.

On the LCD Screen / In the Viewfinder



1 Wind indicator (p. 35)

2 Manual focusing indicator (p. 31)

3 PROGRAM AE mode indicator (p. 26, 27)

4 Steady Shot indicator (p. 33)

5 Backlight indicator (p. 32)

6 Power zoom indicator (p. 12)

7 FADER indicator (p. 25)

8 Picture effect indicator (p. 28, 29)

9 Warning indicators (p. 62)

10 Playing back or recording in Hi8 format

11 Playing back a tape recorded in LP mode (p. 41)

12 Tape transport mode (p. 10)

13 Tape counter (p. 11)

14 Remaining tape indicator (p. 11)

5min → 1min → 0min

15 Remaining battery indicator (p. 42)

16 AUTO DATE indicator (p. 11)

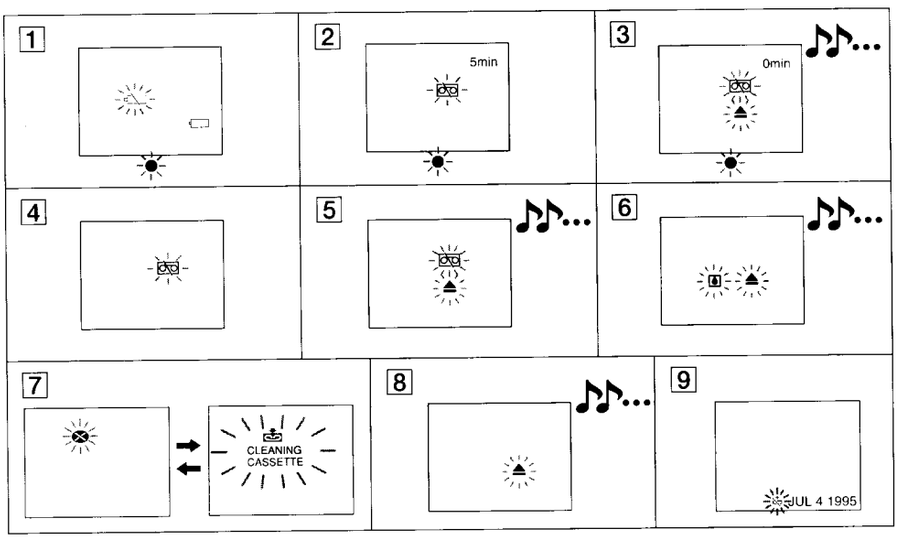
17 Date or Time (p. 24)

18 Recording lamp (in the viewfinder) (p. 10)

Warning Indicators

If indicators flash in the viewfinder or a caution lamp on the camcorder flashes, check the following:

♪ : You can hear the beep sound when the BEEP is set to ON (p. 35).



1 Battery Remaining
Slow flashing: The battery is weak.
Fast flashing: The battery is dead.

2 The tape is near the end.

3 The tape has run out.

4 No tape has been inserted.

5 The tab on the tape is out (red) (p. 9).

6 Moisture condensation has occurred (p. 45).

7 The video heads may be contaminated (p. 46).

8 Some other trouble has occurred.
Disconnect the power source and contact your Sony dealer or local authorized facility.

9 The lithium battery is weak or the lithium battery is not installed (p. 39).

Index

A
AC power adaptor 6, 22
Adjusting viewfinder 11
AUTO DATE 11
A/V connecting cable 36, 38

B
BACK LIGHT 32
Battery 59
Battery indicator 42, 61
Battery pack 6
BEEP 35
BRIGHT 13

C
Camera recording 10
Car battery 23
Charging battery 6
Cleaning video heads 46
Connection 36, 38
COUNTER RESET 11

D
DATE/TIME 24
DEMO 60
Digital zoom 12
DISPLAY 19

E
EDIT 35
Editing 37
EDITSEARCH 17
EJECT 9
END SEARCH 21

F, G, H, I, J, K
FADER 25
Fade-in/Fade-out 25
Fast-forward 18
High-speed shutter mode ... 26

L
LANC 57
LCD panel 13
Lithium battery 39

M, N, O
M. FADER 25
Manual focus 30
Menu system 34
MIC (microphone) jack 57

P
Picture effect 28
Playback 18
Playback pause 20
Portrait mode 26
Power sources 22
Power zoom 12
PROGRAM AE 27

R
Rec Review 17
Remote Commander 58
Rewind 18

S
Shoulder strap 58
Sports mode 26
STANDBY 10
Standby mode 11
STEADY SHOT 33
Supplied accessories 5

T, U, V, W, X, Y, Z
Tape counter 11, 61
Tripod mounting 16
Trouble check 50
Twilight mode 26
VOLUME 18
Zoom 12